MAY / JUNE 1985 *The Grape-growing & Winemaking Review* $3.75

PRACTICAL WINERY

BULK RATE
U.S. POSTAGE
PAID

"One of the most important things that I consider when purchasing equipment is the availability of service to us."

Mr. Mike Nury
President
Vie-Del Company

"Valley has a tremendous reputation for reliability. That's very important to decision making. We cannot afford to wait three or five days for a part to be air freighted from Milan or someplace else. We just can't afford it."

"With Valley, I can call and have equipment running by morning. We have to have dependable service and parts availability so we can get our workers back on the job."

Valley keeps in excess of one million dollars worth of spare parts and materials in inventory at all times. And fast parts delivery is backed up by our skilled field repair teams, dispatched from factory to your winery to get you back on stream as quickly as possible. Think of us as part of your team.

Responsible, responsive service *when you need it*—it's something you really can't import. Think about it. AMETEK, Valley Foundry & Machine Div., 2510 S. East Ave., Fresno, CA 93706. Tel: (209) 233-6135.

MADE IN USA

AMETEK
VALLEY FOUNDRY & MACHINE DIVISION

SEE US AT A.S.E.V. BOOTHS 94-95

Know us for filters? A lot of customers rely on us for CORKS, too.

STERISEAL™ CORKS

Your good name deserves the world's best cork

A cork is not a cork. We know. And all Scott Steriseal™ corks are (1) dedusted under high vacuum blower; (2) treated in a special process to control moisture and guarantee wine sterility; (3) **impregnated** (not just surface treated) with paraffin or silicone for an even coating, easy insertion and removal; (4) tested in our own labs for wine sterility; (5) packed in heat-sealed bags under a blanket of SO_2; and (6) your (good) name branded on quantities as low as 10,000.

The best supplies, services, and equipment—**SCOTT LABORATORIES.**

Wine Making Supplies

Filtering Materials

Corks and Packaging Materials

Laboratory Services

Laboratory Supplies

MANZINI • MENESTRINA • K.E.W. • SCHENK • SABAT • VELO • R&D • UNI-PAK • AMERICAN FUJI • GUTH

SCOTT LABORATORIES

Serving Wine Since 1933

In the USA:

Scott Laboratories, Inc.

P. O. Box 9167, San Rafael, CA 94912
(415) 457-8460

Telex-171494 Scoti SRFL

In Canada:

Scott Laboratories, Ltd.

950 Brock Road South
Pickering, Ontario, Canada LIW2A1
(416) 839-9463

Telex-06-981445 Scottlab PICK

SEE US AT A.S.E.V. BOOTHS 129-131

Letters to the Editor

Dear Editor:

Doug Power's 'Purchasing a Wine Press' article on pages 39-40 of the March/April 1985 issue of *PRACTICAL WINERY* contains the following disputable points regarding membrane presses in general:

1. *Average* yields for membrane presses are more like 180 gal/ton and can approach 190-200 gal/ton under exceptional circumstances with easy-to-press varieties. The stated value of 170 gal/ton is exceptionally low.

2. Average yields for membrane presses of 180 gal/ton or more are extremely *low* in suspended solids and phenolic compounds; *not* higher.

3. While press cycle times of 3.0 hours are used in Europe, membrane press cycle times in the United States, particularly California, are 1.5 hours or less. The amount of time required to fill a membrane press is a function of the particular winery's delivery system. *Conservatively,* an hour might be required, pushing total cycle time to less than 2.5 hours, but certainly not 4.0 hours.

Clean-up is not usually done per press cycle, but daily, after pressing is done. This is true for all press types, and it could be argued that membrane presses can be cleaned more thoroughly and easily than any other type of press.

4. Even without knowing how other membrane press suppliers are pricing 20-ton membrane presses, $75,000 is probably 50% higher than any supplier is asking.

5. Suspended solids above 4% are rarely, if ever, observed with membrane presses, with the probable range being more like 1-3%, depending upon press type. The stated value of "1-7% with a probable range of 2-3%..." is twice as high as might be expected.

We have not seen objective data showing membrane and impulsion presses with comparable suspended solids levels.

6. Most, if not all, membrane press users do *not* separate juice into different fractions of varying quality because high quality, low solids, low phenolic juice is obtained throughout the press cycle. This is one of the reasons the membrane press has become the most popular press on the market.

7. Only one operator is required to operate one (or more) membrane presses. By stating the "Manpower requirements (for an incline dejuicer and impulsion press) are ½ of a membrane press...", the author appears to imply a non-existent "½ man" can operate an incline dejuicer and impulsion press.

8. The cost effectiveness of a membrane press *increases* with increasing size. From the data provided, the cost effectiveness of an impulsion press appears to decline from $4,800 per ton/hr for a 10 ton/hr system to $5,600 per ton/hr for a 25 ton system.

9. Given these various disputable points, calculations could be made to show a 20 ton membrane press has a cost per ton per hour as much as 60% lower than stated in this article.

Very truly yours,
R. Ivan Linderman, Vice-President
KLR Machines, Inc.
Western Division

Editor's note: In reference to 'Purchasing a Wine Press', press prices have changed since the story was prepared for publication. I would advise any potential press purchaser to double-check current quotations and calculate the proper dollar-value as outlined. Mr. Power acknowledges 180 gal/ton yields are not unusual but juice quality of press yields in excess of 180 gal/ton may have unacceptable phenolics content. In response to Mr. Linderman's point #8: Mr. Power has double-checked his numbers and reports a cost of $4,300 per ton/hour for a 10-ton/hour 500 mm impulsion press and dejuicer; $4,000 per ton/hour for a 25-ton/hour 800 mm impulsion press and dejuicer. These capacities are average estimates for fresh or fermented grapes and may be exceeded.

Opinions Wanted:

Write to
Practical Winery

Dear Editor,

The Virginia Vineyards Association, in an on-going effort to keep our members informed and up-to-date on all aspects of viticulture, is especially impressed with your recent two-part article, 'Economics of Producing Chardonnay', by George Schofield. While the statistics he used will differ from California to Virginia, the principles he explains are certainly applicable in any grape-growing area. Also, Chardonnay is the most widely grown white vinifera in Virginia.

Sincerely,
Sharon Livingston, President
Virginia Vineyards Association

IN MEMORIAM

Gino R. Zepponi, 53, died May 1st in an automobile accident. He was the vice president of winery operations for Domaine Chandon, and co-owner of ZD Winery since 1968, both in Napa Valley, CA. Zepponi's nine-year tenure at Domaine Chandon included innovative adaptation or creation of winery equipment and machinery designed to streamline sparkling wine production, notably automatic riddling machines, case and bin packers and a disgorging machine still in development.

Zepponi's varied engineering background, combined with an extensive education in winemaking, qualified him to consult both internationally and to numerous wineries in California and the Northwest. He was co-authoring a wine chapter for a book on the economics of the foodprocessing industry and was writing a book of anecdotes about the wine business.

He served as a director of the Napa Valley Vintners Association and was affiliated with Knights of the Vine and Wine Tech. Zepponi is survived by his wife and six children, one grandchild, his mother, and a sister.

Contributions may be made to: 'Gino Zepponi Memorial Fund', c/o Napa National Bank, 1015 Adams St., St. Helena, CA 94574.

Dear Editor,

In recent times, it has become quite popular for people in the wine and wine related industries to incorrectly use the terms *Brettanomyces* sp. and *Dekkera* sp. interchangeably. However, they are 2 separate genera (i.e., apples and grapes). Unfortunately, the distinctions between the two yeast genera are not as clear cut as those between apples and grapes, which adds to the confusion. The only difference between counterpart species of the two yeast genera is that *Dekkera* sp. forms spores while its *Brettanomyces* sp. counterpart does not sporulate. All other characteristics between counterparts are exactly the same.

In microbiological terms, a sporulating yeast is called a perfect yeast while the non-sporulating yeast is called imperfect. According to the standard rules of nomenclature for yeasts, the organism is named as its imperfect form unless that particular yeast can be shown to sporulate. Then, and only then, it is called its perfect form. In other words, unless the organism in your barrel can be shown to sporulate it is correctly called *Brettanomyces* sp., not *Dekkera* sp.

For the information of all you budding microbiologists, making known a species of *Dekkera* sporulate is a tooth and nail proposition. Therefore, trying to get a questionable species to sporulate is even more difficult. The highest reported rate of sporulation for a known high rate *Dekkera* sp. is only 10%, which was accomplished with much difficulty.

So please, for accuracy's sake, if you have found under your phase contact microcsope an actidione resistant ogive or hotdog shaped yeast that *seems* to have spores, take it to a qualified microbiologist at a nearby university or laboratory for a positive identification. Most 'spores' have actually been detritus from the growing medium.

Respectfully submitted,
Tex Sawyer, M.S.
Winemaker
Edmeades Vineyards, CA

Dear Editor:

I read the Rapid Cold Stabilization article in the March/April issue of *PRACTICAL WINERY.* We designed and marketed this system for tartrate removal in 1968. We still offer the system.

Consensus of winemakers was shock chilling of the wine was detrimental to the quality. Since I am not an expert in wine quality, I cannot say one way or the other.

Though the article says the wine is shock chilled to near freezing, the scraped surface heat exchangers are used to continuously scrape the ice from the surface of the chiller.

We always felt the system could be adapted to the wine industry in California, helping cut down on their cold stabilizing tank systems, possibly reducing inventories and most importantly, stabilize on a 24 hour a day, 365 day a year basis. The system is efficient in this manner even though the refrigerant temperatures in the heat exchangers must be depressed far below that found in most wineries. Wine to wine plate heat exchangers allow efficient recovery of temperature from the leaving cold wine.

The capital expense required to install a continuous system is thought to be fairly high by the industry. However, when one compares the cost with conventional refrigeration system jacketed tanks, time and manpower consumed, it is very competitive.

Very truly yours,
R.E. Curtis, P.E., President
Power Refrigeration Co.

The Grape-growing & Winemaking Review

PRACTICAL WINERY

MAY/JUNE 1985 VOLUME VI, NO. 1

FEATURES:

6	ASEV Exhibitors, Equipment & Products	
16	Wine Unit Costs	*George M. Schofield*
20	Yeast Hulls	*Don Blackburn*
26	Determing Vine Nutrients	*Mike Marcley*
34	New Protein Removal Process	*Drs. W. Welsh & Y. Parent*
40	Creating a Microclimate	*Pat Summers*
45	Night Hand Harvesting	*Clark Smith*
46	Sauvignon Blanc	
52	Sauvignon Blanc Tasting Notes	
63	Sauvignon Blanc and Food	*Harolyn & Bob Thompson*
64	Juice Bentonite Fining	*Dave Ramey*
66	Methode Champenoise: Viticultural Considerations	*Bruce Zoecklein*
70	Determining Fine Wine Characteristics	*Scott Clemens*
75	Capsules: The Silent Salesmen	*Tony Munro*
77	Secondary Closures Purchasing Guide	
84	Burgundian Viticulture	*Don Blackburn*
89	How to Order a Wine Tank	*Don Jones*

DEPARTMENTS:

10	In The Cellar	*Jake Lorenzo*
12	Winery Water & Waste	*David Storm*
91	PRACTICAL WINERY Library	
92	Services For Grapegrowers and Winemakers	
94	Index of Advertisers	
94	Subscription Form	
94	PRACTICAL WINERY Binder Order Form	

Cover: Sediment in the neck of the bottle from secondary fermentation of Fetzer Methode Champenoise Blanc de Noir photographed by Scott Clemens, Sand Dollar Photographic Studio, 740 Stetson St., Moss Beach, CA (415) 728-5389.

Editor and Publisher:	Don Neel
Managing Editor:	Anne Murphy
Assistant Editor:	Diane Mayfield
Writing Staff:	Don Blackburn, Scott Clemens, Richard Crichton, Peter Gamble, Nancy Lynn Gray, Ray and Eleanor Heald, R. Corbin Houchins, Pat Howe, Denis Kelly, Jake Lorenzo, Michael Marcley, Diane Mayfield, Bruce Rector, George Schofield, Clark Smith, Rod Smith, David Storm, Pat Summers, Carole Taines, Lisa Van Der Water, Gerald Weisl, Bruce Zoecklein
Advertising Manager:	Susan Malone
Art Director:	Lisa Bloch
Printing:	Barlow Printing, Inc., Petaluma, CA
Design Consultant:	Steve Renick, Anselm Design

Offices: Advertising, Circulation, Editorial: 15 Grande Paseo, San Rafael, CA 94903 USA (415) 479-5819.
PRACTICAL WINERY (ISSN 0739-8077) is owned and published by D.F. Neel. Editorial/Business Office: 15 Grande Paseo, San Rafael, CA 94903 (415) 479-5819. Published bi-monthly at subscription rate of $24.00/year. Outside the United States, please add $8.00US sea mail; $20.00US, air mail. Application to Mail at Second-Class Postage Rates is Pending at San Rafael, CA. Postmaster: please send change of address to 15 Grande Paseo, San Rafael, CA 94903. Back issues: $5.00 prepaid.

News media may use no more than 1/4 page of material per issue provided that *PRACTICAL WINERY* is credited.

"I drink it when I'm happy and when I'm sad. Sometimes I drink it when I'm alone. When I have company I consider it obligatory. I Trifle with it if I'm not hungry and drink it when I am. Otherwise, I never touch . . . unless I'm thirsty."

Mme. Lilly Bollinger

(about champagne)

Exhibitors, Equipment & Product Information

36th Annual Meeting

American Society for Enology & Viticulture

MGM Grand Hotel, Reno, Nevada - June 27-29, 1985

A & A Refrigeration Inc.—booth 98—Refrigeration systems

APV CREPACO, Inc.—booth 121—Pumps, heat exchangers

Agri-Fab Industries, Inc.—booth 143—Barrel racks, vineyard supplies

Alfa-Laval, Inc.—booth 93—Centrifuges and heat exchangers

Allen-Bradley/Automation Systems Div.—booths 139-140—Process control equipment

Alloy Products Corp.—booth 125—Sanitary fittings and valves

Allpac, Inc./Del Mar Packaging Sales—booth 136—Rotary vacuum filtration systems

American Fuji Seal, Inc.—booth 132—PVC closures

American Industrial Supply—booth 43—Safety and sanitation products

American Scientific Products—booth 74—Laboratory supplies and equipment

Arus-Andritz—booths 168-169—Grape press

Ashbrook-Simon-Hartley—booth 190—WPF Juice Extractor

Bactomatic, Inc.—booth 190B—Microbial monitoring system

Barrel Builders—booth 83—will feature Boutes & Co. French oak barrels and our line of cooperage supplies. Meet Henri Barthe from Boutes and our staff representatives.

Bio-Rad Laboratories—booth 41—Grape defect analyzer

Bishopric/Enerfab—booth 144—Tank linings

Blake Printery—booths 173-174—provides quality marketing presentations. Labels and promotional materials on display demonstrate the wide range of services they offer.

Brown International Corp.—booths 166-167

Ben W. Brundage Co./Div. Keystone International—booth 163—Valves and flow-monitoring equipment

C-Corp—booth 26—'Winezyme' and chemicals

CEM Corporation—booth 210

CPN Corp.—booth 42—will exhibit the 503DR Hydroprobe which is capable of telling both when to irrigate and how much water to supply. The proven result: optimum crop yield/acre with minimum water usage.

California Glass Company—booths 107-109—Bottles, corks, and tin-lead capsules

Calpac Container Co.—booth 61—specializes in a wide variety of glass bottles for the industry. Products are available in assorted colors and sizes.

Capsule Francaise, Inc.-CF Napa—booth 79—Winery equipment

Carson Optical Instruments, Inc.(Carl Zeiss)—booth 137—Microscopes

Cellulo Company/Finer Filter Products—booths 157-159—will feature PQ Corporation's Silica Sols, Zahm and Nagel's equipment, Ingold Oxygen Analysers and NOVO Pectic Enzymes. The full line of Finer Filter Products will also be displayed.

CENTRICO, Inc.—booth 133—Westfalia centrifuges

Chateau Bottlers, Inc.—booth 116—California's largest mobile wine bottlers, will be introducing its airline and other national account 187 ML bottling and marketing opportunities. Chateau provides cost effective mobile wine bottling with guaranteed quality.

Collard CMV—booth 78—Vine-trimming machines and pre-pruning machines

The Compleat Winemaker—booths 91-92—will display 'The Gasser', a portable and totally self-contained unit for safe, accurate and simple dispensing of liquid SO_2 into tanks and barrels.

Cork and Seal of California, Inc.—booth 5—specializes in sparkling wine packaging. The firm manufactures polylaminated capsules and provides tin-lead capsules, corks and wire hoods from Koeltgen, Sibel and Valentin.

Cork Supply International, Inc.—booth 162—Corks + capsules

Custom Cooperage—booth 200—represents Tonnellerie Mercier, coopers of French oak barrels, puncheons and tanks. Air-dried and fired American oak barrels are available from Kentucky Cooperage. Innerstave, the only real alternative to a new barrel will be displayed.

Danieli Bros. Mfg., Inc.—booth 40—stainless steel tanks

Data Consulting Associates—booth 165—will demonstrate the Winery Production Management System and the Winery Information Management System (for accounting). (The most installed software in the wine industry.)

Dayco Corporation—booth 87—Hose + couplings

Demptos Cooperage Company—booth 60—will have a display of French oak cooperage in sizes up to 500 liters. Products presented will be from Napa, Bordeaux and Burgundy.

Demptos Glass Co.—booth 44—Bottles + capsules

Diamond Label & Printing—booth 114—Labels

Dorr-Oliver Inc.—booths 110-111—Filtration equipment

Eagle-Picher Industries Inc.—booths 134-135—is a well-known producer of diatomaceous earth filter aids as well as cellulistic varieties. Sales engineers and literature will be available.

Enotech Corp./Otto Sick Corp.—booths 11-14—A new Otto Sick bottle rinser/sparger will be introduced and a monoblock 12-spout filler/2-head rotary corker and 6-head capsule spinner will be exhibited. Enotech, exclusive US distributor for tin-lead capsules by VKN of West Germany, will exhibit a wide variety of custom-designed capsules which are supplied to many US wineries.

Equipment Systems Corp.—booth 198—Packaging machines + conveyors

Estate Bottling—booth 181—Mobile bottling

Expo Instruments, Inc.—booth 211—will feature its Microcomputer Data Acquisition System for liquid level and temperature control.

fp Packaging, Inc.—booths 152-153—Corkers, presses and labelers

Fiberglass Representatives, Inc.—booth 115—Fiberglass products

Fischer & Schug Winery Equipment—booths 16-18 + 31-33—will display Fischer membrane presses; Rauch stemmer/crushers; Mohno and Schneider pumps; Omodei lees and plate-and-frame filters; Spadoni pressure leaf filters; Canelli, Quaglia & Giuso, and Cavagnino & Gatti bottling equipment; steamers; and more.

GAF Corp.—booth 226—Polyclar

Genencor Inc.—booth 76—will be displaying Pectinol®, Pectic Enzymes, Pectinol® DL and Anthocyanase.

Givaudan Corp.—booth 213—Flavors

Goodall Rubber Co.—booth 156—Rubber products

GREFCO, Inc.-Dicalite Products—booth 88—will be displaying their line of filteraids, including diatomaceous earth.

Hach Co.—booth 206—Analysis equipment

ITW-Agtex—booth 147—Viticultural supplies

Industrial Chemical Co.—booth 223—has many winery chemicals, including most major manufacturers, both domestic and foreign. Visit Louis Matheisl, Ozzie Bates, and Ron Perry to obtain a new, extensive winery brochure.

International Paper Co.—booths 220-222—Packaging machines

JWI, Inc.—booth 197—Filter presses

Jersey Shore Steel Co.—booth 10—Metal grape stakes

Jim's Supply Co., Inc.—booth 117—Viticultural supplies

JV Northwest Engineering, Inc.—booth 142—will demonstrate the 'Floating Lid' stainless steel wine tank. All types of tanks as well as valves, fittings, piping and complete installation are available.

K.E.W. Industries, Inc.—booths 127-128—High pressure cleaning systems

KLR Machines, Inc.—booths 119-120—is the exclusive North American direct-factory representative for BUCHER (presses), UNIPEKTIN (concentrators, desulphurizers, dealcoholizers), GULTIC (corks) and SANOPLAST (PVC capsules and heat tunnels).

Bruce King & Co.—booth 84—will show new vineyard nettings and other items. They can custom design a system for your vineyard that eliminates birds completely and is highly cost-effective.

Koppers Co., Inc.—booth 36—Vineyard supplies

Krones, Inc.—booth 96—Labeling equipment

L & A Engineering & Equipment, Inc.—booths 66-67—Pumps

L & L Fabricators—booth 118—Stainless steel tanks and catwalks

Ladish Co., Tri-Clover Div.—booth 154—Pumps, stainless steel fittings and valves

Lafitte Cork & Capsule, Inc.—booth 59—will display tin-lead capsules from Bouchage Metallique (France), PVC capsules from Coliege Metalco (France), and corks from S.I.C. (Portugal).

Liqui-Box Corp.—booth 186—Bag-in-Box systems

Liquid Air Corp.—booths 171-172—Industrial gases

Lord Label Systems, Inc.—booth 146—Labeling equipment

Manville—booths 89-90—Filter aids

Marsh Stencil Machine Co.—booth 106—Visual inspection systems

Meyerworld Packaging Machinery Co.—booths 150-151—will exhibit technically advanced labeling equipment including MEYER/Precision for pressure sensitive labels and MEYER/Alfa Labelers serving smallest to largest applications. Also available are MEYER/Cortellazzi still liquid fillers.

Miles Laboratories, Inc., Biotech Products Div.—booth 34—will feature juice processing enzymes including pectinases, cellulase, hemicellulase, and alpha-amylase. We will also feature citric acid, potassium benzoate, potassium citrate, potassium sorbate, sodium benzoate, sodium citrate, and ascorbic acid.

Millipore—booths 187-189—will display filtration equipment including prefilters, final filters and ultrafiltration which remove phenols, proteins, yeasts and bacteria from wine.

The Moffett Co., Inc.—booths 68-69—Perrier bottle rinser and winery supplies

Monsanto Co.—booth 104—Round-up herbicide

Paul Mueller Co.—booths 160-161—Stainless steel tanks and heat exchangers

NASCO West Inc.—booth 199—Quality control sampling equipment

New Jersey Machine Inc.—booths 112-113—Labeling machines

North Star Company, Inc.—booth 148—Vineyard supplies

Nuclepore Corp.—booths 38-39—Filtration equipment

Omnidata International, Inc.—booth 80—Portable data recording equipment

Orbisphere Laboratories—booth 209—Oxygen measurement systems

Pickering Winery Supply—booths 101-103—is the exclusive distributor for O'SULLIVAN (Paints, Coatings), AEB (Yeasts, Fining Agents) and SABATE (Corks). Computers and winery software (production, accounting) and chemicals are available.

Pneumatic Scale Corp.—booths 123-124—supplies a 21,600 bottle/hour wine filler. Design of the 'below-the-shoulder' nozzle allows a gentle flow while minimizing aeration and oxygen absorption.

Premier Chemical Corp.—booth 138—Cleaning compounds

Price Waterhouse—booth 75—Computer software for winery and vineyard operations, and accounting

Process Engineers, Inc.—booths 37 + 64—will show a PEI bottle blower that may be mounted on a conveyor. Information on their complete line of winery equipment will be available.

Prodo-Pak/Franrica—booth 15—Packaging machines

Lafitte

supplies corks and capsules from the following divisions

BOUCHAGE METALLIQUE
FRANCE
Tin-Lead Capsules

S. I. C.
SOCIEDADE INDUSTRIEL DE CORTICAS
PORTUGAL
Corks

COLIEGE METALCO
FRANCE
PVC Capsules

Visit us at ASEV Booth #59

LAFITTE CORK & CAPSULE
1180 Hamilton Ct. • 415/322-1838
Menlo Park, CA 94025

Prospero's Equipment Corp.—booths 46 + 55—will offer wine-making equipment including crushers, filler-corkers, filters, presses, and pumps.

RJU Industries—booth 85—Filters + chemicals

Ramondin USA—booth 228—Capsules

Redwood Lithograph Inc.—booth 214—Labels

Riekes Container Co.—booths 21-23—Bottles

Rohm Tech Inc.—booth 126—Rohapect® for improved wine production: 100% or more increased filtration rate; 30-50% increased pressing capacity; 30% or more increased color extraction; perfect clarity and stability.

Warren Rupp-Houdaille, Inc.—booth 8—Pumps

Santa Rosa Hydraulics—booth 149—Wine hose + other rubber products

Santa Rosa Stainless Steel—booth 73—Stainless steel tanks

I.F. Schnier Co., Inc.—booth 71—Corks and closures

Scholle Corp.—booths 62-63—will be demonstrating various Bag-In-Box packages for wine and an automatic filling machine, the Auto Fill 12C, which can fill up to 20 4-litre bags/ filling head.

Scott Laboratories, Inc.—booths 129-131—will exhibit for the 31st consecutive year and will show pumps, filtration materials and machinery, packaging supplies, tank agitators and laboratory materials.

SEN (Seitz Enzinger Noll) Machines, Inc.—booth 72—will show a TIRAX 8/1 filler/corker, a WILLMES Universal Press and two plate-and-frame filters. Representatives of all manufacturers will be available.

Seguin Moreau/Stefanich—booths 191-192 + 207-208—will exhibit 12 different samples of imported barrels available and an oval oak cask. A short video tape of barrel manufacture at Seguin Moreau will be shown.

SITEVI c/o International Trade Exhibitions in France—booth 86—Information on exhibition scheduled for Nov. 26-28, 1985

Snowden Enterprises Inc.—booth 105—SO_2 dispensing equipment

Sonoma Grapevines, Inc.—booth 65—Gravevines and cuttings

Spokane Metal Products—booths 24-25—will exhibit a standard fixed top wine tank and a variable capacity 'Vintage 1' floating-top wine tank. Representatives will be available for any questions on tankage needs.

Tec-Era Engineering Corp.—booth 141—Pumps + filters

Technipac, Inc.—booths 1-2—Labeling machines

Tonnellerie Francaise—booth 70—imports and manufactures barrels and oak tanks in the old French tradition. Glass bottles and barrel washers are also imported.

Transamerica Delaval Inc.,/Gems Sensors Div.—booth 180—Liquid level monitoring equipment

Universal Foods Corp.—booth 179—Freeze-dried yeasts

Up-Right Harvesters—booth 212—will have a slide presentation of mechanical grape harvesting and pruning. Richard Sewell and Bob Schmidt will have information available on their agricultural equipment.

VWR Scientific—booth 155—Laboratory equipment

Valley Foundry & Machine Works (div. of Ametek)—booths 94-95—will have new brochures covering crushers, presses, dejuicers, tanks and parts. Parts, field service, engineering and a complete line of winery equipment and supplies are available.

Van Waters & Rogers—booth 185—Chemicals

Vintners Supply Company—booths 182-184—Filter presses, ultra-filtration, cartridge filters

Waukesha Foundry Div., Abex—booth 35—Pumps

Western Kraft Paper Group—booth 122—Bag-in-Box packaging + corrugated packaging

Wilden Pump & Engineering Co.—booth 97—will display cutaway models of Wilden's air-operated, double-diaphragm, positive-displacement pumps designed to handle from very thin material applications to very thick and very abrasive products. The pumps handle up to 90% solids to over 250-foot heads in permanent, submerged and self-priming operations.

Wine Appreciation Guild—booth 164—will display over 300 different wine books including two new important technical wine-making titles: "Knowing and Making Wine" by Emile Peynaud and "The Wines of Bordeaux" by Edmund Penning-Roswell. New audio-video wine education materials, a new Champagne Key, the Dr. Pesante Corkscrew among many wine accessories, free wine maps and posters will be available!

Wine Things Unlimited—booth 58—Wine-related gifts

Wine and the People—booth 100—will display pumps, have complete details on bladder and impulse presses, and a range of stemmer/crushers from 1 to 50 tons/hour.

Wine Lab—booth 224—will display analytical equipment, various fining agents and resultant wines. Information on microbiology will be available. ASEV members are invited to participate in a winemaking quiz and raffle.

Wine Industry Technical Seminar—booth 225—Information on meetings and proceedings

A.R. Zacher Co.—booth 99—Capsules

Zero Manufacturing Co.—booths 81-82— Stainless steel tanks

See you at ASE!

100% BIRD CONTROL

NEW PRODUCTS AND SYSTEMS OFFER COST EFFECTIVE BIRD CONTROL FOR YOUR VINEYARD

LET US SHOW YOU HOW AT BOOTH 84 IN RENO

BRUCE KING & COMPANY

1055 Bertelsen, Eugene, Oregon 97402 (503) 485-0050

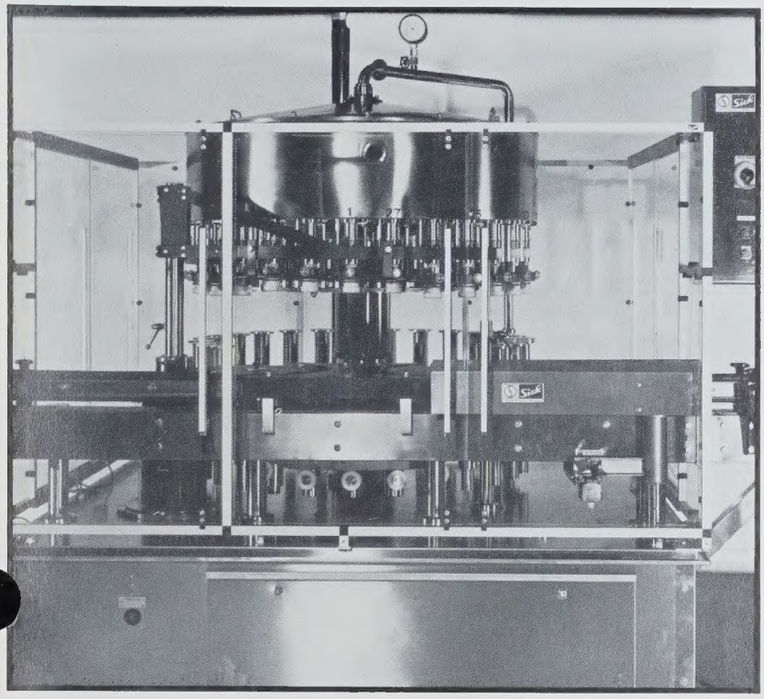
OTTO SICK BOTTLING EQUIPMENT:

FILLERS AND CORKERS

Available as separate machines or in monoblock design, with filler and corker synchronized on a common base.

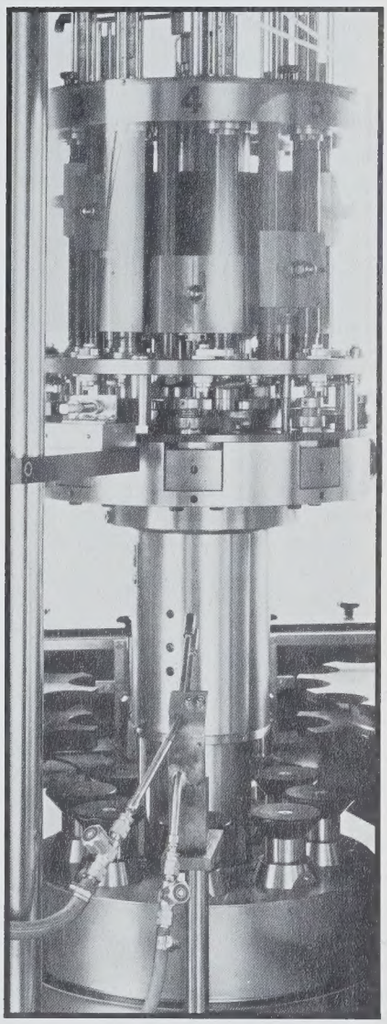
Sick INTERNATIONAL®

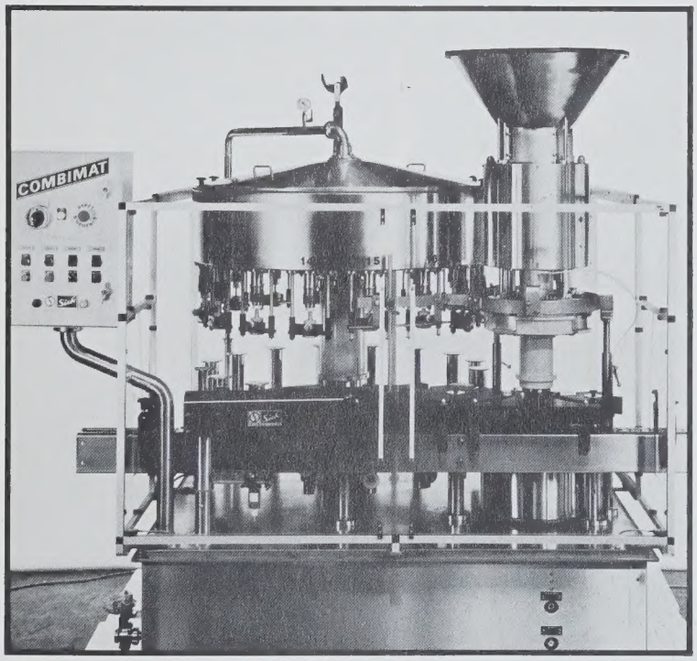
Serving Winemakers throughout the world since 1909.



27-Spout Gravity Filler. Non-leaking valves, with quick and easy valve disassembly for cleaning and sterilization. Valve sealing between fixed and moving parts by means of patented food-grade silicone rubber bellows joint with high mechanical properties and a temperature resistance up to 230 °C. Contrary to more conventional O-ring sealing where the moving parts penetrate into the liquid zone causing exposure to air, the advanced OTTO SICK valve sealing system was developed based upon enological principles to avoid contact between the wine and the return air.

6-Head Corker with vacuum and optional jaw heating. Jaws can be disassembled in mere seconds for easy cleaning and sterilization. Champagne corkers with automatic cork orientation, crown corkers and bar-top machines are also available.





Monoblock 16-Spout Filler/4-head Corker. Spacesaving, compact design. Corks are inserted as quickly as possible after filling and bottles never leave positive star wheel control between filler and corker.

We design, manufacture and install complete bottling lines.
More than 75 years of experience as a manufacturer of wine and Champagne bottling equipment assure you of solid quality and reliable service.

OTTO SICK CORPORATION, P.O. Box 1101, Palo Alto, California 94302
415/858-1090 • Telex 348362

SEE US AT A.S.E.V. BOOTHS 11-14

In The Cellar

Jake Lorenzo

Editor's note: Listening to Jake talk about friends, grandparents and wordly sayings takes me back to my own youth. Aglow with a warm inner feeling, I ruminated through old memories trying to remember that all important piece of wisdom from my Gramma, that one phrase she said over and over that affected my entire life. Finally, it came to me, "Don, don't do that."

I know detectives have a hard-nosed, tough-as-nails image, but the truth be known, most of us are sentimentalists. The private eye business is often sleazy, corrupt and tawdry. It is occasionally violent. Hard edged cynicism is easy to come by.

I guess that is why I put so much faith and energy into friends. Good friends root you to the past and promise an interesting future. In thinking about my friends I have found a common link, that all important running thread in the fabric of my life.

Each of Jake Lorenzo's friends has had a wonderful parent or grandparent to serve as a fount of wisdom. Lance Cutler's Baba had many insightful sayings, but the one Lance lives by is, "If you plant potatoes, you wouldn't get tomatoes." Jim McCullough's grandmother used to say, "Jimmy, me boy, ye were cut out te be a gentleman, but the devil ran away wi' the pattern."

My own grandmother Bertie, gave me advice that has saved me on more than one occasion. Bertie used to say, "Wound 'em first, then fight."

I guess that what I'm talking about is history. A sense of it. A way of anchoring oneself in one's past so we can confidently steam ahead into the stormy waters of our future lives. Obviously, precious few of us live with these anchors. Most people seem to bob on the waves, drifting with the currents, directionless. They lack that connection with their past and wander aimlessly toward their future.

It's not the proper way to undertake a journey, yet it seems to describe a majority of the present wine industry.

Remember the early seventies? When grape growers and winemakers gathered the conversation inevitably turned to grapes, clones and soils. Great discussions would develop over which varieties to plant, where to plant them and how to grow them.

Later in the seventies, similar gatherings would feature great arguments over winemaking technique. Skin contact, fermentation temperatures and fining procedures became common topics of discussion.

Whether the discussions centered on grape growing or winemaking, they were vociferous and invigorating. People would argue and listen and mull and make decisions. Conversation was based on confidence and curiosity. Participants would take in information, evaluate it, and then act upon it. They made for exciting times.

Nowadays, whenever people in the business get together the topic for conversation is marketing. Grapes and wine are out. Discounts, programming and PR are in. Nobody asks, "Who's your winemaker?" Now the question is, "Who's your distributor?"

The change in topics from grapes to wine to marketing is not what bothers me. But the energy and confidence that characterized those early discussions has been replaced by a sense of helpless desperation, and desperate people rarely make bold, creative decisions.

The California wine industry of even 10 years ago was directed by a rogues gallery of strong willed, stubborn, creative characters. Martin Ray, Joe Heitz, Joe Swann, Paul Draper. Andre Tchelistcheff and Bob Mondavi knew exactly what they wanted to do and how they wanted to do it. They didn't care what others thought. They didn't listen to advice that said it couldn't be done. They simply did it the best they could.

These people and others like them gave the industry its direction, and their flamboyant personalities lent the industry a large portion of its romance. Winemaking then was a grand experiment and the experiments weren't always successful. They were however, always unique and wildly creative.

Now, in the desperate days of flat sales and marketing directors, even the industry giants are turning conservative. Supple, lively, well-balanced wines are fine, especially when done to perfection. Too often the sheep in the industry fail in their attempts and we end up with over-fined, eviscerated wines that lack both charm and subtlety.

We need some young turks to say, "The tide be damned."

We need to hear more about those people making big, heavy, lush wines. People who take what they have learned about technique and apply it to push winemaking farther out along the edge, instead of folding back up into innocuous little wines that hopefully will please everyone's palate.

Remember Jake's first law: Balance in all things.

The industry is losing its balance. The pendulum has swung too far. The future does not lie in producing a wine to please everyone. Success lies in producing a wide range of varied wines which can provide pleasure to a wide range of people with varied tastes.

Let personality reign. Let's not be sucked under by the unimaginative frightened people. Let's go back to the vitality, the root of the industry.

Hell, we can sum it up in one short, insightful phrase: "I'd rather have a bottle in front of me, than a frontal lobotomy."

WINEMAKER/ENOLOGIST

Premium 30,000 case Texas winery seeking experienced, hands-on winemaker. Must have demonstrated track record of producing high quality varietals. Responsible for entire production function and small winery vineyard. Must have ability to supervise personnel, to work effectively with growers and to operate in a team environment.

Salary and benefits commensurate with experience and creative talent. Send resume with salary history and references to:

Llano Estacado Winery, Inc., P.O. Box 3487, Lubbock, Texas 79452

USED BARRELS FOR SALE

60 gallon French Nevers Oak barrels . . . $40 each
50 gallon American Oak barrels . . . $30 each

For information call Joseph Phelps Vineyards
(707) 963-2745

Service for Two!
We Have Quality Bottles: We Have Availability.
Let Us Serve You.
Calpac Container Co.
Representatives for Madera Glass and Northwestern Glass
33359 Central Avenue, Union City, CA 94587, (415) 471-5091

SEE US AT A.S.E.V. BOOTH 61

Winery Water & Waste

D.R. Storm, Ph.D., P.E.

Wineries and Wastewater Regulations: A Stroll Through the Bureaucratic Labryinth

Water Pollution: Who Needs It?

Water pollution control and clean-up of the nation's streams and groundwater supplies has had the public's attention and interest for nearly three decades. For whatever personal reasons, each individual apparently has decided that preservation of water quality for future generations has a high priority.

I recall a poll by a Congressman 8 or 10 years ago, in which he asked his constituents to rank national and local problems in order of perceived priority: crime, air pollution, poverty, inflation, unemployment, urban sprawl (among others) and of course, water pollution. The Congressman's poll rated water pollution as the most serious problem to be given governmental attention.

Because we drink it, swim in it, water our lawns with it, bathe in it and because it constitutes 98% of the mass of our body, it is an important substance. The logic follows that laws and regulations governing its protection get our unequivocal support.

Murky Waters

During the early 1950's before it was generally recognized that befouling of our waters was not very sensible, (and prior to passage of legislation forcing abatement of untreated or poorly-treated waste discharges), the attitudes of most industrial enterprises and municipal waste dischargers was to maneuver into a position of actively pursuing an abatement program without actually doing anything.

It was during this awkward period that a clever attorney was more valuable than a consulting engineer in relieving the pressure from well-meaning, but lightly-armed water pollution control enforcement agencies.

The insidious and unseen highly toxic pollutants that receive public attention currently, could not even be measured by state-of-the-art analytical techniques in 1952. The general public only became aware of pollution in those early days when it was either seen or smelled. Individuals who either resided in the San Francisco Bay area 30 years ago or who had occasion to traverse the San Francisco-Oakland Bay Bridge at low tide, can remember the breath-taking, septic sewage odors that came from the mudflats on the east end of that structure.

Fishing for striped bass in San Francisco Bay in those days was actually quite good, particularly around raw sewage outfalls. The floating human detritus in the Bay was always a fascination for me—a lasting image which may have influenced my later pursuit of a career in sanitary engineering.

San Francisco and environs are my cases in point, but similar tales could be told for the Ohio River, Chesapeake Bay, Boston Harbor, Galveston Bay and other water bodies throughout the USA during that era. All that has changed, and while there are still serious liquid waste problems to be dealt with, the majority of the nation's streams, lakes and coastal waters are greatly improved today.

Who's Responsible for What?

This section should probably be written by *PW* contributor R. Corbin Houchins, Esq., whose view of law may be substantially different from mine. My experience has been in planning and designing the works that satisfy the law.

My reporting of the foundation and structure of the law is to help to put it in such a perspective that it can facilitate winery wastewater problem solving. Just as your knowledge of state vehicle laws can help to keep you from having an accident, or causing one because of ignorance, so can your understanding of pollution laws keep you out of trouble.

As in most governmental functions, the Federal Government, the states and local governments have divided the responsibility for water pollution control. Using California as the example, a master statewide agency (State Water Resources Control Board) acting through its Regional Water Quality Control Boards, oversees the water pollution abatement program for the State.

Membership of the Regional Boards is such that industry, agriculture, urban, suburban, technical and non-technical sectors of each region are represented. The San Francisco Bay Regional Board has had winery owner Louis Martini as a Board appointee and currently, Eric Wente, another winery owner, occupies a seat on that Board.

One major task of the State Board is to administer both the state and federal versions of the Clean Water Act, which provides grant and loan assistance to public agencies. Until December 31, 1981, there were grant funds available for industrial waste dischargers if they discharged to a publically-owned waste treatment facility.

Wineries could have become involved in this program, if they were a discharger within a municipal jurisdiction and additional treatment of disposal capacity was required to accommodate the additional waste loading. Under the Clean Water Grant Program, the State acts as a disbursing agent for both federal and state grant and loan funds.

For the past decade, in California at least, the State also provided design review and construction management services to ensure that federal/state funds were properly spent, but since 1983, has relinquished that role to district offices of the US Army Corps of Engineers.

Every winery in California must file an annual report of waste discharge to the appropriate Regional Water Quality Control Board, unless the waste is discharged to a municipal sewerage facility. This report usually contains a monthly estimate of flow, gallons of wine produced, and the approximate constituency of the waste.

One important aspect of the California waste discharge report for wineries concerns any change in the operating plan or capacity of the facility. For example, if a winery contemplated an expansion program that would increase or decrease tons of grapes processed or gallons of product produced, the application for waste discharge should be amended by notifying the appropriate Regional Water Quality Control Board in writing of the winery's intentions. While this seems like an added burden of red tape, it does help the State enforcement officers to reconcile a radical change in flow or waste character that is documented in the winery's annual report.

The waste discharge reporting procedures for the states of Washington, Oregon and Texas are almost the same as California.

By California law, the Health Department is responsible for

★ ★ ★ NEW IN 1985 ★ ★ ★

- 187 ML (SINGLE SERVING) BOTTLING AND CAPPING
- AIRLINE WINE MARKETING
- NEW EQUIPMENT
  - Inverted bottle purger/sparger and unscrambler table
  - "POSI-SEAL" low oxygen pickup filling valves
- LOWER DIRECT LABOR COSTS DUE TO OVERALL INCREASED BOTTLING EFFICIENCIES

COST EFFECTIVE MOBILE BOTTLING WITH GUARANTEED QUALITY

CHATEAU BOTTLERS

Main Office:
P.O. Box 2274,
Napa, CA 94558
(707) 253-1254

San Rafael Office:
26 Woodland Avenue
San Rafael, CA 94901
(415) 454-2355

water 'contamination' (Health and Safety code 5410-5463), and the Water Resources Control Board has jurisdiction over water 'pollution' (Water Code Div. 7). While this distinction may appear to be rhetorical hair-splitting, the *legal* definition of contamination is water pollution that endangers public health. Water pollution in the broadest sense is the alteration of water quality such that its many beneficial uses are impaired.

For anyone seeking an excellent summary of California water law, including water pollution control law that does not stun the non-legal mind, read The California Water Code, Vol. 68, *California Water Law in Perspective*, LXV-CVIII. For readers outside of California who want to know more about their state's respective enforcement policies and pollution laws, contact the State for information, usually in the form of a procedural summary for filing for a waste discharge.

Pollution laws in other states have been compared and discussed in several excellent references, which are noted at the end of this column. Most state laws are models of the Federal Water Pollution Control Act. If not so structured, it is likely that Federal grant funds for planning, design and construction of publicly owned treatment works would not have been forthcoming.

Regulatory Agencies and Best Protocol

For wastewater problems and waste discharge violations of modest scope and scale at the winery level, the winemaker or one of the winery principals can be very effective in clearly articulating the fiscal or operational impacts of alternative actions from the 'cease and desist order' (hopefully not) to the presentation of a plan of action for eliminating or improving the situation.

My experience has been that if an honest effort is made by the winery to comply with the local or state law, and that due diligence is shown in executing a plan of action, that the enforcement officer will meet the winery half-way in achieving a workable solution. The levying of fines of $10,000 per day in California is generally applied to flagrant violators or habitual violators.

Harking back to the 'contamination' issue, where a real hazard to public health is involved, there is less likely to be any grace period given by the enforcement people to the winery in developing solutions or effectuating them.

One of the most important inter-facings with water pollution control agencies comes with the construction of a new winery that does not discharge to a publicly-owned sewerage system. Here the guidance and assistance of a professional design team (architect, engineer and attorney) is essential.

Wineries, which routinely deal with the Treasury Department's BATF and other state (Alcoholic Beverage Control) and local (County Planning and Public Works Departments) are often perplexed when faced with the sometimes overlapping jurisdictions in the water quality control field.

For example, Sonoma County in California does not permit the installation of so-called 'package'[1] wastewater treatment plants for non-publicly owned and operated dischargers. The belated discovery of this policy has required frantic back-pedaling by wineries, who went shopping for equipment as they would for tanks, crushers and barrels.

For systems where sanitary waste is separated from process waste, the design approvals for the sanitary waste elements generally rest wholly with the local State Department of Public Health Sanitarian. As most wineries are required to

[1]Package plants are pre-fabricated, aerobic treatment systems which can be manufactured in various sizes and aeration capabilities to handle a wide range of waste. Sonoma County's experience was that once installed, they were not properly operated and maintained.

AMERICAN SOCIETY FOR ENOLOGY AND VITICULTURE

1985 ANNUAL MEETING
June 27, 28, 29

The largest and most attended meeting of its kind in the United States. An excellent opportunity to display your products to the world's leading winemakers and viticulturists. The newest research is presented in technical sessions.

For information contact:
American Society for Enology and Viticulture
P.O. Box 1855, Davis, CA 95617
Phone (916) 753-3142

MGM GRAND HOTEL
RENO, NEVADA

WINE BOTTLES BOUGHT & SOLD
GLASS STERILIZATION
NEW CARTONS & DIVIDERS
ENCORE! (415) 234-5670
860 So. 19th Street, Richmond, CA 94804

produce 'zero waste discharge', the many methods of achieving that goal are often challenging for the winery and the design engineer alike.

Recycling (*PW*, Vol. V, No. 5) is often the engineering solution presented to the reviewing agencies. A 'wet year' or other agreed upon hydrologic condition water balance, performed by the designer, must show that all process wastewater (and sanitary waste, if a combined system) can be stored and safely disposed of on-site without discharge to a stream, estuary or other water course.

A zero discharge system for a winery in the arid portion of southern California utilized my services to demonstrate that all process wastewater could be disposed of by solar evaporation from holding ponds even with a 25% increase in wastewater flows over the previously approved design capacity. Quite by accident, two years after the study was completed, the 'design rainfall' year occurred and the ponds became brim full, but did not spill.

Adequate *lead time* in formal submittals of any kind to state/federal agencies is a must, if construction schedules are to be met. For example, before an application for waste discharge can receive formal approval before one of California's Regional Water Quality Control Boards, a minimum of 90 days should be allowed. (Staff review, inter-agency comments and placement on the agenda with 30 days notice for protestants to act if they choose to do so.)

Finally, keeping good records and files on all wastewater associated activities is essential for present peace-of-mind and future sanity and for the unanticipated succession of winemakers and staff who might inherit wastewater responsibilities. A cardinal rule in dealing with design concept approvals and other elements of the system operation is *confirm everything in writing*—your winery's attorney will love you for it. If you feel a gentleman's or gentlewoman's handshake and promise are still binding, get into another business—massive headaches are just around the corner.

A subsequent *PW* column will discuss wastewater system monitoring and record keeping.

References

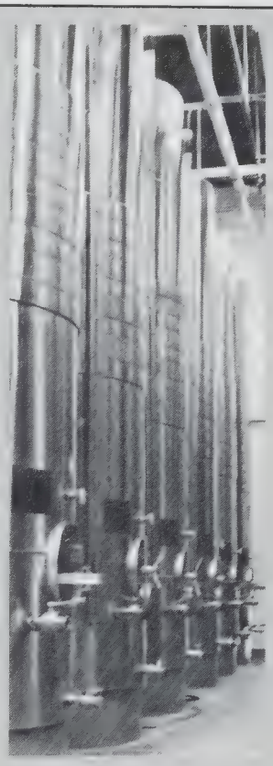
1. *California Water Code*, Vol. 68. Sections 1-6999. (See preface by Gavin Craig, Chief Counsel for State Water Resources Control Board.)

2. *Pollution and Industrial Waste*, Practising Law Institute, NY, No. 16, 1970.

3. *A Comparative Study of State Water Pollution Control Laws and Programs*, Heath, M.S. Jr. Water Res. Institute, Univ. of N. Carolina, January, 1972.

4. *Water Quality Control Legislation*, Middlekauff, R. Practising Law Institute, NY, No. 75, 1975.

5. *Legal Control of Water Pollution*, UC Davis Law Review, Vol. I, 1969.



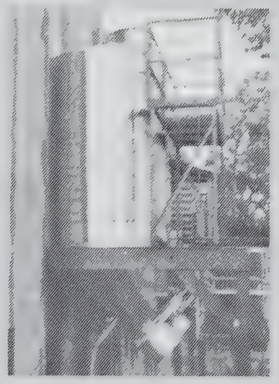
F.W. Langguth Winery
Washington

JV NORTHWEST, INC.

18088 SW LOWER BOONES FERRY ROAD
PORTLAND, OREGON 97223

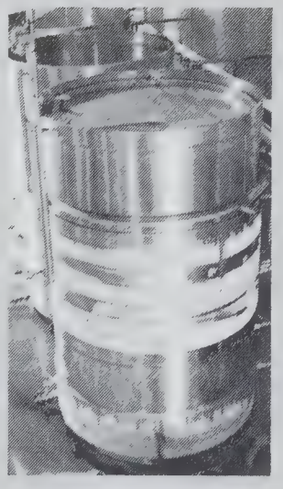
(503) 684-1490

- INVISIBLE INSIDE SEAMS
- J.V. DESIGNED VARIABLE CAPACITY OR "FLOATING LID" TANK AVAILABLE
- ALCOVES—MANHOLES—SPECIAL FITTINGS AND VALVES TO MEET YOUR NEEDS
- SUPERIOR M.I.G. CONTINUOUS MACHINE WELDS
- CLOSED SYSTEM COOLING JACKETS
- RADIUS CORNER FOR STRENGTH AND EASY CLEANING



Drainer Tanks
Sokol Blosser Winery
Oregon

Chateau Benoit
Oregon



Variable Capacity Tank
Belvedere Winery
California

Dual Action
In-Swing Manhole
Doors

Leasing Available

STAINLESS STEEL TANKS FOR THE WINE INDUSTRY

Wine Unit Costs

George Schofield

One doesn't have to be around a winery too long to realize that the economics of making wine cannot be safely ignored. It is simply not enough to make good wine. Many of the wineries which have experienced survival difficulties have not failed because they couldn't make good wine. Some of the problems arose because they couldn't sell their wine as fast as they could produce it. However, more basic was the inability to sell their wines at a price sufficiently above cost to cover overhead and interest.

In 1973 North Coast winery owners and enologists, facing the aftermath of the frosts of 1970 and the rains of 1972, frantically bid up the price of Cabernet Sauvignon grapes to as high as $1,000/ton. Few took the time to figure out the arithmetic of making wine from such expensive grapes and selling it for $4 or $5 per bottle retail. If they did they would have realized the likely disaster.

Annual Review

Before crushing a ton of grapes each year, the winery owners and winemakers ought to set down and pencil out the pro-forma future financial results of their efforts. They should estimate, even roughly, the likely cost of the finished case of each type of wine they intend to produce and relate it to the probable selling price. Doing so might raise some serious questions about grape prices and whether their planned volume and mix of new wines makes any economic sense.

The key to the suggested review process is the unit costs estimation. Without a solid notion of unit costs, a winery is operating blindly. Success can and does arise regardless, but the risks are inordinate in such a competitive industry. Besides overall profitability, pricing decisions and strategy are incomplete without a reference to unit costs. The monitoring of operating efficiency, evaluating of production personnel and management, as well as the planning processes are all dependent to some extent on the objectivity and reliability of unit costs.

Estimated Costs

Conceptually, unit costs usually are considered on an 'actual' basis or 'estimated' basis. Actual costs to a large extent, however, are a misnomer for all unit costs include estimates of various forms. For example, the depreciation element of a unit cost can not be definitively calculated. At the closing of the books each year, no one knows exactly what the useful life of the existing crusher or press is. The accountant can use an apparently precise figure of ten years, but, in fact, this could be off significantly.

The need to estimate doesn't destroy the concept of unit costs. Rather the necessity should imbue the preparers and users with a degree of caution and common sense. The guardian angel of accountants is offsetting errors. Accordingly, as long as the assumptions are in the middle ground of probability and not collectively optimistic or pessimistic, depreciation and other factors can reflect reasonable estimates without overall concern. Hence, neither the accountants nor production management ought to get carried away with artificial accuracy. Calculations can be run out to five decimal points but as long as the depreciation and other major factors are based on rough estimates, the overall accuracy should be recognized to be far more limited.

With the reality being that all 'actual' costs are to some degree estimated costs, the issue becomes the trade-off between the timeliness of data and the relative accuracy of estimates. With unit costs the tendency has been for the accountant to spend too much time calculating artificially accurate numbers.

NAPA VALLEY'S OLDEST COOPERAGE
BARREL BUILDERS
SOLE REPRESENTATIVE FOR
BOUTES & CO. FÛT FRANCAIS
• WE SPECIALIZE IN QUALITY BARREL SHAVING AND REPAIR
• WE BUY AND SELL USED COOPERAGE
1085 LODI LANE, ST. HELENA, CALIF. 94574 (707) 963-7914

SEE US AT A.S.E.V. BOOTH 83

Exhibit 1
Table of Standard Cost

			Bulk Wine		$/Case			
Wine Type	Vintage	Size (ml.)	$/Gal.	$/Case	Packing Material	Bottling Labor & Overhead	Shipping And Warehouse	Grand Total
Cabernet	1982	.750	$10.276	$24.405	$6.654	$1.350	$1.500	$33.909
Cabernet	1982	1.500	10.276	24.405	5.098	1.100	1.500	32.103
Pinot Noir	1982	.750	9.684	22.809	6.048	1.350	1.500	31.707
Chardonnay	1983	.750	10.417	24.740	7.159	1.350	1.500	34.749
Chenin Blanc	1984	.750	5.165	12.269	6.563	1.350	1.500	21.682

Standard Costs

Actual unit costs also suffer from the tendency of accountants to recalculate. Every time something different happens there is a tremendous urge to recalculate to get the latest actual unit costs. One way around this dilemma, as well as the timeliness problem, is the concept of 'standard' unit costs.

Prior to the beginning of a fiscal year, an estimate of finished goods unit costs is made based on what should happen. This projection of 'normal' is defined as standard unit cost.

Based on what grape prices should be, wine yields should occur, glass should cost, etc., a total standard cost per case of wine is developed for each major wine type, by vintage and by size. The typical end results of the coordinated effort for each major element of the finished case of wine is illustrated in Exhibit I.

Each factor of the unit is calculated and reviewed separately with inputs coming from all concerned (the grower representative, the purchasing manager, the cellar foreman, the bottling line supervisor, etc.). Individual department budgets and production planned volumes are key elements as well as a detailed packaging specification for each wine to be bottled. (Exhibit II)

Standard unit costs are quite versatile and useful tools. Every time a new bottling occurs, essentially a spending or consumption allowance is created for each component. At the same time, cased goods inventory valued at the total of all components is established. When the wine is sold, sales is offset by the same finished good value, thereby matching revenue with the appropriate accumulated costs while simultaneously reducing cased goods inventory.

Variances

The spending allowance created for each cost factor at the point of bottling always differs somewhat from actual experience. With a good set of standard costs, the variances from each month's results tend to be minor and offsetting in nature. The differences are accumulated in a series of 'variance accounts'. In this way, the financial records can be balanced without detailed changes to unit costs or line by line changes to profit margins reports by wine type.

A refinement in the use of standard costs on packaging materials frequently used is to drain off 'purchase price' variances when recording vendor invoices. This helps in monitoring purchasing trends and effectiveness as it separates the price variance from the usage variances. With the aid of good perpetual inventory records of packaging components, consumption variances then can be monitored effectively.

Normally, variances are analyzed at least quarterly with the portion related to wine sold during the year charged or credited to income. In essence, this converts financial results back to 'actual' on an aggregate basis.

Managing Changes in Standards

The temptation to change standard costs during mid-year should be avoided. For instance, if bottling labor and overhead are running very favorably to plan with a resultant favorable variance, management may want to see this reflected immediately in wine unit costs and the related product line profit reporting. This process tends to degenerate into frequent and complete revisions, with the extra work and confusion rarely equalling the benefit. When this occurs, someone inevitably is a month late in changing over and variances start to arise from administrative errors and timing differences.

Maintaining control over who, and when standards can be changed, is a difficult process. The more sensible approach is to restrict standard unit cost changes to the beginning of each new year and coordinate all revisions with top management approval of profit plans and budgets.

Exhibit 2
Packaging Specification
1982 Cabernet Sauvignon: .750 Liter

	$ Unit	Units Per Case	Breakage Loss Factor	Total Cost
Glass: Bordeaux Green #16025 With Shipper	$4.50	1	1%	$4.545
Corks: Extra First; 1¾ Inch	.120	12	1%	1.454
Foils: Tin, Red #662	.050	12	1%	.606
Labels	.004	12	2%	.049
	TOTAL			$6.654

WATER SUPPLY AND WASTEWATER
ENGINEERING FOR WINERIES

DAVID R. STORM, Ph.D., P.E.

STORM ENGINEERING

(916) 795-3506
15 MAIN ST., P.O. BOX 681, WINTERS, CA 95694

Applications

The techniques used in a standard cost systems are somewhat detailed but are basically simple in concept. Among the practical day to day applications which these tools facilitate are:

1. *Expediting Monthly Income Data* Essentially, as soon as the mix of wines sold in a month is identified, the 'cost of goods sold' can be calculated on a 'standard basis'. (Exhibit III)

Rather than waiting 20 to 30 days for the accountant to finish the preparation of monthly income statements, a flash report (Exhibit IV) can be prepared within two or three days. Using reliable standard costs and reasonable estimates of selling, administrative, and interest expenses, the flash report ought to be consistently close to the accountant's final numbers.

2. *Management by Exception* Variance analysis and reporting is an ideal vehicle for management to highlight abnormal events and results. Special reports on all major variances at the end of each quarter should be prepared not only to focus attention on action on non-seasonal unfavorable variances, but also to acknowledge and encourage favorable activities.

3. *Simpler Review of Profitability by Wine Type* Standard costs reflect normal costs and in certain cases are a better reference than actual costs, which may reflect very unusual circumstances. A review of selling prices relative to standard unit costs can give a quick insight into which wines are contributing to the well being of the winery. A typical analysis is illustrated in Exhibit V. More sophisticated results can be obtained by further deducting the interest costs related to the wine production as well as variable selling expense.

This first article has dealt generally with the nature of unit costs. The framework of standard costs has been outlined without delving into the process of the determination of bulk wine costs. Two sequels will attempt to focus on the methodology of converting grape costs, as well as cellar labor and overhead, into wine unit costs for each variety and vintage.

Exhibit 3
Estimated Cost Of Wine Sold For A Month

		Bottle Size In Liters	Cases Sold	Standard Cost $/Case	Total Cost of Wine Sold
Cabernet Sauvignon	1982	.750	581	$33.91	$19,702
Cabernet Sauvignon	1982	1.500	52	32.10	1,669
Pinot Noir	1982	.750	216	31.71	6,849
Chardonnay	1983	.750	749	34.75	26,028
Chenin Blanc	1984	.750	278	21.69	6,030
	TOTAL		1,876		$60,278

Exhibit 4
Flash Income Statement

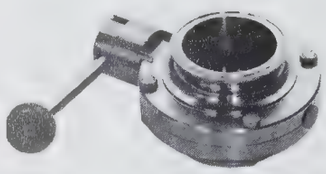
	Amount	% of Sales	$/Case
Total Cases Sold	1,876		
Sales	$112,268	100.0%	$59.84
Cost of Wine Sold	60,278	53.7%	32.13
Gross Margin	$ 51,990	46.3%	$27.71
Selling Expenses	18,000	16.0%	9.59
General & Administrative Expense	6,000	5.3%	3.20
Operating Income	$ 27,990	24.9%	$14.92
Interest Expense	17,000	15.1%	9.06
Pre-Tax Income	$ 10,990	9.8%	$ 5.86
Provision for Income Taxes	5,495	4.9%	2.93
Net Income	$ 5,495	4.9%	$ 2.93

Exhibit 5
Gross Margin Analyses

		Bottle Size in Liters	$/Case Selling Price	$/Case Stand. Cost	Profit Margin*	Profit Margin As % of Sales*
Cabernet Sauvignon	1982	.750	$60.00	$33.91	$26.09	43.4%
Cabernet Sauvignon	1982	1.500	$60.00	$32.10	$27.90	46.5%
Pinot Noir	1982	.750	$48.00	$31.70	$16.30	34.0%
Chardonnay	1983	.750	$72.00	$34.75	$37.25	51.7%
Chenin Blanc	1984	.750	$36.00	$21.68	$14.32	39.8%

* *Before Selling, General & Administrative and Interest Expenses*

George M. Schofield is a C.P.A. and a graduate of Harvard Business School. His firm, George M. Schofield Co., specializes in economic and financial planning services for vineyards and wineries. He is an author, and a frequent public speaker on wine industry topics.



Butterfly Valves
Precision Quality
1½" TriClover or butt weld: $130
2" TriClover or butt weld: $135
3" TriClover or butt weld: $224

Pressure Vacuum Relief Valves
Stainless Steel
Drosophilia Screen
Dust & Dirt Cover
O Ring Sealed
for 3" TriClover: $126
for 4" TriClover: $260
for 6" TriClover: $380

Also From This Fine German Manufacturer:
S/S Full Port Ball Valves • Tank Sample Valves
Racking Inserts

Machinery • Equipment • Supplies for the Wine Industry

THE COMPLEAT WINEMAKER
1219 MAIN STREET
ST. HELENA, CALIFORNIA 94574
707-963-9681
TWX 510-746-6176

WILDEN PUMP

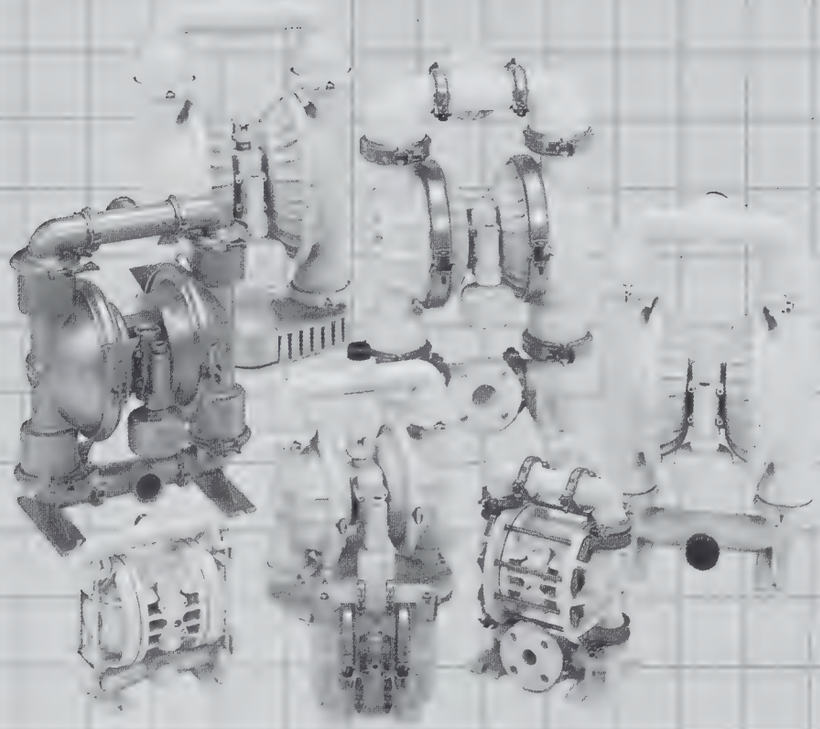
Announces

NEW IMPROVED 1985

HIGHER PERFORMANCE

MORE EFFICIENT

DIAPHRAGM PUMPS



The 1985 Wilden pumps deliver up to 13 percent higher maximum flow rates, reduced air comsumption averaging over 10 percent across the performance range, the same high reliability and low maintenance Wilden pump users love, and the same old low prices.

Wilden, the originator and leader in air-operated, double-diaphragm pumps for over 27 years, maintains a continuing R and D effort to insure its pumps are "state of the art". For the **1985 improved performance models**, Wilden has redesigned the air sections of every pump aerodynamically tuning ports and passages to minimize turbulence and drag, decreasing internal energy losses, and maximizing energy transfer to the fluid being pumped. These improvements can be retrofitted to pumps you already have in service by ordering the improved, genuine Wilden air distribution section components.

More sizes, more materials, more value.

Just what you'd expect from Wilden!

WILDEN PUMP & ENGINEERING CO.

22069 Van Buren St., P.O. Box 845, Colton, CA 92324
Phone: (714) 783-0621
Telex: 676-452

SEE US AT A.S.E.V. BOOTH 97

Yeast Hulls

Don Blackburn

French researchers in Bordeaux have been studying the role of steroids as yeast survival factors for some years. In the context of this research on yeast viability, enologists became aware of the influence of fatty acids produced by the yeasts, and of the apparent toxicity of such fatty acids on yeast activity. These observations have given greater significance to yeast's known adsorptive properties and the role of the yeast's cell wall/membrane complex in that adsorptive capacity.

For many years, yeast cell walls/membranes have been a by-product of industrial production of yeast autolysate used as a nutritional addition during fermentation. The term 'yeast hull' refers to the cell wall/membrane complex. Some papers written in English use an improper translation of the French term. The expression 'yeast ghost' is too vague to inspire the confidence of prudent winemakers.

The yeast's cell wall offers support and gives the cell its characteristic form. Lying directly beneath it, the cell membrane provides the cell a selective permeability which permits the entrance of nutrients and elimination of waste products. The cell's need to maintain this permeability throughout its lifetime is the major concept explaining the beneficial role of yeast hulls in enology.

Research into yeast hulls has rapidly become one of the major subjects of study at the Institute of Enology in Bordeaux, France. In the Institute's report of 1983-84 research, 30% of papers presented dealt with yeast hulls, making this the major single topic. It was reported that several million gallons of wine have now been treated throughout Bordeaux, the vast majority with success.

Nature of the Problem

E. Labatut *et al.*, studied the toxic effects of octanoic and decanoic acids on fermenting yeasts. They found that *S. cerevisiae* in a medium with 160 g/l sugar and 3.5 pH was inhibited by 10 mg/l decanoic acid or by 50 mg/l octanoic acid. Fermentation onset was delayed 11 days by 50 mg/l decanoic acid, and 6 days by 150 mg/l octanoic acid. These delayed fermentations never reached completion. At higher concentrations, these two fatty acids precluded any fermentative activity.

In a must to which 150 mg/l octanoic acid was added, the yeast population had assimilated 34 mg/l of that fatty acid by the time the yeast's growth phase was well under way. Moreover, this lot was found to contain high levels of ethyl octanoate and ethyl decanoate, levels well above control lots. It was apparent that these esters had been synthesized from the added octanoic acid.

Labatut found that when a given fatty acid was added before fermentation, a substantial portion of it was consumed by the yeast and transformed into a quantity of that acid's ester as well as the esters of longer chain fatty acids. This behavior applies to fatty acid doses high enough to temporarily inhibit yeast growth, but not adequate to manifest absolute toxicity. Esterification appears to be the first defense mechanism employed by the yeast cell against fatty acids, and is linked to the less injurious influence of fatty acid esters.

The presence of fatty acids during alcoholic fermentation not only diminishes sugar consumption, it also interferes with the yeast's production of volatile compounds which contribute to the aromatic quality of the finished wine.(5)

Active Role of Yeast Hulls

Addition of 0.2 g/l yeast hulls 48 hours after the onset of fermentation had two roles.(9) First, it brought about an increase in total yeast population. Second, and most important, it prolonged the yeast's maintenance phase. During the

ONE SIZE DOES NOT FIT ALL!

Our full line of fixed top and variable capacity wine tanks have impressed winemakers from coast to coast. Our quality control in manufacturing and competitive costs to customers are two reasons to call us for more information.

SPOKANE METAL PRODUCTS

P.O. Box 3621 • Spokane, WA 99220
WA State 1-800-572-3709 Outside WA State 1-800-541-3601

SEE US AT A.S.E.V. BOOTHS 24-25

Table 1

Evolution of Fatty Acids at the Yeast Cell's Surface in the Presence and Absence of 0.2 g/l yeast hulls added 48 hours after initiation of fermentation.

Figures show pg/10^8 yeast cells. (Larue et al. 1984 Institute of Enology)

Fatty Acid	Condition	Day 1	Day 3	Day 6	Day 13
Hexanoic Acid	With Yeast Hulls	traces	traces	traces	traces
	Without Yeast Hulls	traces	traces	traces	traces
Octanoic Acid	With Yeast Hulls	0.43	0.21	0	0
	Without Yeast Hulls	0.43	0.45	0.30	0.36
Decanoic Acid	With Yeast Hulls	0.96	1.19	0.54	0.67
	Without Yeast Hulls	0.96	2.15	2.07	1.06
Dodecanoic Acid	With Yeast Hulls	1.10	1.26	0.56	0.27
	Without Yeast Hulls	1.10	1.62	1.74	0.48

Table 2

Effect of Yeast Hulls vs Ammonium Sulfate *(Lafon-Lafourcade et all)*

Sugar at outset: 260 g/l = 26° Brix Fermentation temperature: 25° C = 77° F
Inoculation: 1 million cells/ml active dry S. cervisiae

0.2 g/l Yeast Hulls	0.2 g/l $(NH_4)_2SO_4$	Cumulative sugar consumption 7 days	12 days	19 days	23 days
none	none	128	156	171	176
before fermentation	none	182	205	212	214
after 48 hours	none	189	225	230	230
none	before fermentation	137	178	185	188
none	after 48 hours	143	168	171	175
before fermentation	before fermentation	189	211	217	217
after 48 hours	after 48 hours	195	221	232	233
after 48 hours	before fermentation	200	234	240	240

decline phase, the proportion of viable yeast cells remained higher than that in control lots.

The study also showed that when fermentations took place in the presence of 0.2 g/l yeast hulls, endocellular levels of octanoic, decanoic, and dodecanoic acids were diminished. Further, it was observed that octanoic acid was eliminated from cell-surface fixation by the sixth day of fermentation. Concentrations of decanoic and dodecanoic acids fixed onto the cells surface were substantially lowered. (Table I)

Presence of yeast hulls resulted in a small decrease in fatty acids in the must (the liquid phase), as well as a decrease in concentrations of most fatty acid esters on and within the cell. In the must, however, ester levels resisted modification. It appears the esterification equilibrium, in reacting to ester fixation onto yeast hulls, acts much as the must's acid buffer effect. The equilibrium fluctuates to replace the missing molecules.

A study carried out by Geneix *et al.*, (2) showed that active constituents of yeast hulls are polysaccharides which are insoluble in must. This same study compared fermentation stimulation effect of yeast hulls and cellulose powder. A must containing 260 g/l sugar (26°Brix) received 0.2 g/l yeast hulls or 0.2 g/l cellulose after 2, 4, or 10 days of fermentation.

Each of the two additives yielded maximum results when added after consumption of the first 50 g/l sugar. In lots which received additions at this stage, stuck fermentation occurred with residual sugars of 60 g/l in the control, 33 g/l with cellulose, and 7 g/l with yeast hulls. Yeast hulls thus assured the most complete fermentations. A double dose of cellulose did not improve performance. Related experiments showed that cellulose has little effect on decanoic acid, the major yeast inhibitor. Current studies are examining the precise roles of various insoluble polysaccharides of the yeast hull.

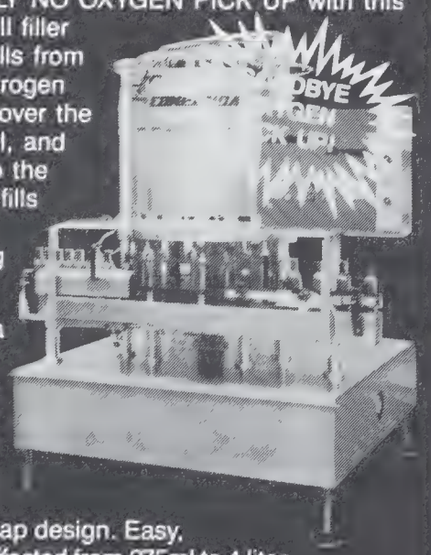
How to Use Yeast Hulls

Lafon-Lafourcade *et al.*, (7) treated a white wine whose fermentation had stuck at 8 g/l residual sugar with 0.5 g/l yeast hulls. Within 24 hours, 54% of the octanoic acid and 80% of the decanoic acid had been eliminated. An active dry yeast inoculation at this stage led to sugar depletion after 18 days at 19°C (66.2°F). Predictably, the secondary fermentation produced octanoic and decanoic acids, as well as ethyl octanoate and ethyl decanoate, but not enough to preclude completion.

Simultaneous addition of yeast hulls and ammonium sulfate either before onset of fermentation or 48 hours after inoculation offers little increased efficiency over addition of yeast hulls alone at either of these two times. However, ammo-

WST COMPENDA
BOTTOM-FILL BOTTLE FILLER

THERE IS VIRTUALLY NO OXYGEN PICK UP with this true gravity, bottom-fill filler from Germany that fills from 20 to 500 bpm! A nitrogen blanket is laid down over the wine in the filler bowl, and bottle air is vented to the atmosphere as wine fills the bottle from the bottom up, via a long SS filler tube.



Our WST Compenda has positive and repeatable level control and is available as a filler only or filler/closure monobloc with natural cork, screw cap, or crown cap design. Easy, quick changeover is effected from 375ml to 4 liter bottles. Full CIP sanitation.

Call today for further information.

PROCESS ENGINEERS, INC.
(415) 782-5122
3329 Baumberg Avenue • Hayward, CA 94545

Table 3

Influence of the moment of Yeast Hull Addition *(Lafon-Lafourcade et al)*
Sugar at outset: 260 g/l = 26° Brix Fermentation temperature: 25° C = 77° F
Inoculation: 1 million cells/ml active dry S. cervisiae

Moment of Addition	Dose (g/l)	Final Quantity of Sugar Fermented
Before Fermentation	0.2	213 grams/litre
	0.5	220
Second Day	0.2	230
	0.5	241
Fifth Day	0.2	204
	0.5	216
Thirteenth Day	0.2	186
	0.5	190

nium sulfate added before fermentation followed by yeast hulls 48 hours later yielded the best results of any of the options tested in Bordeaux. (Table II)

In another test(7), 0.2 g/l and 0.5 g/l yeast hulls were added to a must at three stages of fermentation: on the second, fifth and thirteenth days. (Table III) At these times, the fermentation had already consumed 41, 125 and 157 g/l sugar from a starting point of 213 g/l (21.3°Brix). In each case, yeast hulls improved yeast performance compared to control lots. The greatest quantity of sugar fermented corresponded with the addition 48 hours after onset of fermentation. The preferred dose of yeast hulls in this test was 0.5 g/l.

These experiments showed that addition of 0.2 g/l $(NH_4)_2SO_4$ before fermentation coupled with addition of 0.2 g/l yeast hulls 48 hours after start of fermentation yielded a sugar consumption rate equivalent to that generated by 0.5 g/l yeast hulls preceded by no ammonium sulfate.

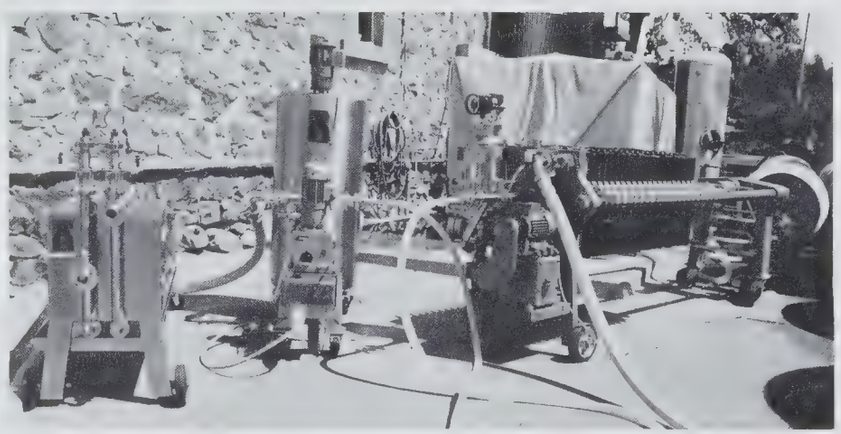
Lafon-Lafourcade found that stuck fermentations are most effectively restarted with decline-phase inocula. Active dry yeast were found to be successful as long as the must was below 11% alcohol. Above this concentration, musts reacted better to normally propagated starters which were old enough to have consumed most of their sugar.

In this same group of studies(7), yeasty flavors were encountered when yeast hull doses exceeded 0.7-1.0 g/l accompanied by 0.2-0.3 g/l active dry yeast serving as a re-inoculum. The consensus in Bordeaux is that 0.2-0.3 g/l yeast hulls constitute an adequate dose when used as a preventative, *i.e.*, when added after consumption of 50 g/l sugar. After a fermentation has stuck, the remedial dose should be 0.3-0.4 g/l. In the first case, when fermentation is still active, yeast hulls may simply be poured into the top of the tank. When used after a premature stoppage, the addition should be followed by a pumpover.

Specific Applications of Yeast Hulls

The statistical distribution of causes of stuck fermentations in France is different than in California. For example, in France stuck fermentations are more common in red wines than they are in California because French winemakers, as a whole, have less efficient temperature control methods. In

2K PACKAGING ENTERPRISES, INC.



Strassburger filter equipment at Ehlers Lane Winery, St. Helena, California

CORKS AND CAPSULES
Beco Filter Sheets
Monobloc or Synchrobloc Bottling Equipment, 1,200-30,000 bph
Champagne Bottling and Riddling Equipment

Home office and warehouse;
7914 S.W. Nimbus Avenue
Beaverton, Oregon 97005
phone: (503) 641-8990 telex: 151733 twok beav

some vintages, overheated fermentations are widespread. It is unclear how some years favor such stoppages, or why native yeasts in a given winery will sometimes be inhibited at 32°C (90°F) and will sometimes proceed effortlessly at 35°C (95°F).

In France, the greater incidence of stuck fermentation caused by pesticide residue can be attributed to the moist climate, and hence wider use of sprays. Similarly, the advent of stuck Chardonnay fermentations in California appears to be linked to vine habitat. Researchers have noted an association of amino-acid deficiency and river bottom vineyards exhibiting excessive spring foliar growth. When a red wine fermentation sticks because of overheating, French enologists advise immediate pressing, sulfiting (to preclude lactic spoilage) and reinoculation with yeast.

Research carried out by Lafon-Lafourcade *et al.*, (7) showed that presence of yeast hulls permitted continuation of red wine fermentation at higher temperatures than control lots. Indeed, 34°C (93.2°F) and a momentary peak at 38°C (100.4°F) were taken in stride. In this study, yeast hulls also afforded a superior extraction as reflected in phenol analysis and color intensity.

During the past several years, 40 stuck wines were treated, totaling 100,000 hl (2.64 million gallons). 35 instances yielded successful results. In the remaining five, failure was caused by winemaker impatience (SO_2 addition) or by a simultaneous malolactic fermentation interfering with yeast activity. In the case of white wines, the major causes of stuck fermentations encountered in Bordeaux were pesticide residues and excess clarification preceeding fermentation.

Botrytis cinerea produces fermentation inhibitors which are substantially countered by the addition of yeast hulls. Lafon-Lafourcade experimented with musts concentrated by *Botrytis*, containing 360 g/l sugar (36° Brix). She found that fermentations which stuck with excessive residual sugars were more successfully prevented with an early addition of 0.2 g/l yeast hulls than with a reinoculation with active dry yeast after cessation of fermentation.

Labatut *et al.* (4) found that yeast hulls can be beneficial in certain cases of nutritional deficiency. One of their experiments involved a synthetic medium deficient in pantothenic acid (200 g/l sugar, pH 3.5). One half gram/litre yeast hulls improved sugar consumption by 20% after 28 days of fermentation at 25°C (77°F). Yeast populations underwent a parallel increase in total viable cells/ml.

Labatut concluded that yeast hulls partially compensated for pantothenic acid deficiency. This vitamin is the essential component of coenzyme A, which plays a part in lipid synthesis. Yeast hulls appear to intervene in this case through their depletion of fatty acids within the yeast cell. This hypothesis will be the subject of further study.

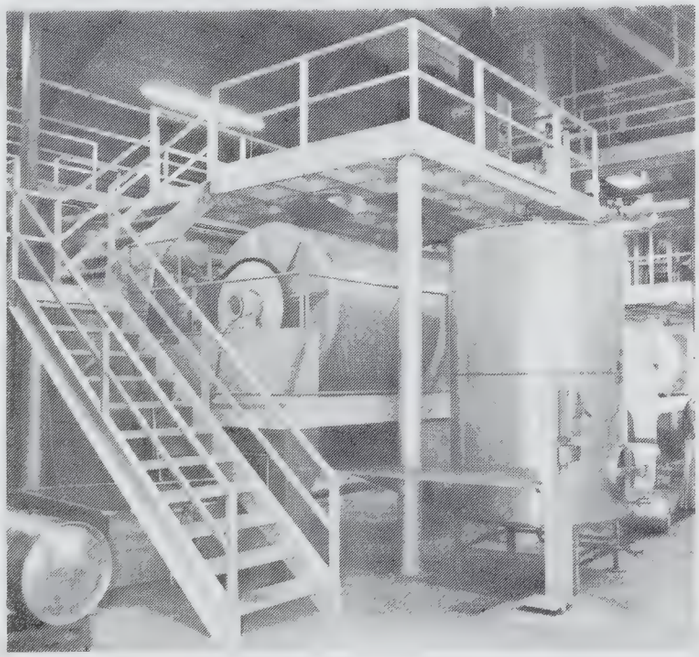
Experimentation by Lonvaud-Funel(10) considered the role of fatty acids and their esters in the malolactic fermentation. A wine was stripped of its fatty acids and fatty acid esters. Analysis before and after the ensuing malolactic fermentation indicated that the ML bacteria had synthesized small quantities of fatty acids.

Table 4
Influence of Yeast Hulls on Red Wine Phenolic Composition.
(Glories et al)

		Tannins g/l	Gelatine Index*	Anthocyanins mg/l	IC′ (= d420 +d520 + d620)
25°C (77°F)	Control	2.34	66	503	1.3
	Yeast Hulls	2.53	65	519	1.74
37°C (98.6°F)	Control	2.90	60	286	1.26
	Yeast Hulls added before Fermentation	2.62	57	269	1.69
	Yeast Hulls after stoppage of fermentation	2.66	58	285	1.79
	Yeast Hulls added before Fermentation **and** after its stoppage	2.36	48	267	1.74

** The Gelatin Index is a measure of astringency. It is in direct relation to fermentation temperature, and inverse relation to the amount of yeast hulls added. These data indicate that yeast hulls, while increasing color in red wine, tend to decrease astringency.*

WESTEC
WINERY EQUIPMENT



we can supply you with:

Barrel Mixers — Fining Inductors
Barrel Washers — Hose
Catwalks — Pumps
Custom Tools — Topping Systems
Fittings (stock & custom)

we can design, fabricate and install:

Catwalks — Must Lines
Wine Transfer Lines — Structural Steel Assemblies
Automatic Barrel Washing equipment

We can help you with ideas and applications.
Most important—
We service what we sell, when you need it serviced.

Call or come by, we will be glad to meet you.

P.O. Box 338 — (707) 433-8829
195 Dry Creek Road — Healdsburg CA 95448
a subsidiary of IRAPP, Inc.

Conclusion

Larue *et al.*, (9) concluded that yeast hull addition has the effect, during the yeast's stationary phase and beginning of the decline phase, of cleaning fatty acids from the yeast cell surface. The result is a prolonged viability of non-multiplying yeasts, and thus a stimulation of the fermentation. This indicates that the yeast cell has been freed of the most toxic of these fixed substances, and implies that the inhibiting action of these fatty acids manifests itself mainly at the cellular surface.

Lafon-Lafourcade *et al.*, (7) found that yeast hulls, used as a preventative, are most effective when added after consumption of the first 50 g/l sugar (drop of 5°Brix). The ideal dose is 0.2-0.3 g/l yeast hulls at this stage. When added later on in the fermentation, yeast hulls have a beneficial, but less effective influence. They can even help a fermentation when added near its completion. According to researchers in Bordeaux, no other additive can duplicate this performance, notably, none of the following: bentonite, diatomaceous earth, carbon, or cellulose powder.

Yeast hulls added just after the start of fermentation have an additive effect when ammonium sulfate is added just before fermentation. This dual addition lessens the needed dose of yeast hulls. Doses of yeast hulls above 0.5 g/l may decrease beneficial volatile elements in the must. Furthermore, one could conceivably encounter yeasty flavors at higher concentrations. Larue *et al.*, (9) showed that 0.2-0.3 g/l yeast hulls added toward the beginning of fermentation do not significantly alter the wine's aromatic characteristics.

Bordeaux research indicates that yeast in growth phase should not be used to restart stuck fermentations. Active dry yeast are suitable when ethanol concentration is below 12%. A propagated inoculum in decline phase is preferred when alcohol is at or above this level. Reinoculation, according to Lafon-Lafourcade's research, should take place 24 hours after yeast hull addition, to allow time for toxin fixation.

Given the diverse causes of sluggish and stuck fermentations, one should not assume that yeast hull addition constitutes a cure-all. Dr. Ralph Kunkee of UC Davis feels the abundance of older vines in France may explain the effectiveness of yeast hull addition there. He is not certain that yeast hulls would be as effective in the USA. He does, however, suggest that American wineries which experience stuck fermentations would do well to try yeast hulls as a possible remedy.

During the spring of 1985, yeast hulls underwent testing by a well-equipped California winery. Successful results would be followed by BATF review and possible approval.

References

1. Geneix,C., Lafon-Lafourcade S., and Ribéreau-Gayon P. *Les Causes, La Prevention et le Traitement des Arrêts de la Fermentation Alcoolique,* Institut d'Oenologie, Université de Bordeaux II, 1984.
2. Geneix C., Dubourdieu D., Larue F., and Lafon-Lafourcade S., *des Fractions Adsorbantes parmi les Composants des Ecorces de Levure Stimulation de la Fermentation Alcoolique par Certains Polysaccharides,* Institut d'Oenologie, Univeristé de Bordeaux II, 1984.
3. Glorie Y. and Augustin M., *Influence des Ecorces de Levure sur la Couleur du Vin Rouge,* Institut d'Oenologie, Université de Bordeaux II, 1984.
4. Labatut E., Lafon-Lafourcade S. and Larue F., *Recherces sur Quelques Propriétés des Ecorces de Levure,* Institut d'Oenologie, Université de Bordeaux II, 1984.
5. Labatut E., Caruana C., Bertrand A., and Lafon-Lafourcade S., *Action des Acides Octanoïque et Decanoïque à l'Egard de Quelques Levures en Croissance dans le Moût de Raisin,* Institut d'Oenologie, Université de Bordeaux II, 1984.
6. Lafon-Lafourcade S., Geneix C., and Ribéreau-Gayon P., *Essais Pratiques en 1983 de la Stimulation de la Fermentation Alcoolique par Traitement des Moûts et des Vins au Moyen d'Ecorces de Levure Fould-Springer,* Institut d'Oenologie, Université de Bordeaux II, 1984.
7. Lafon-Lafourcade S., Geneix C., and Ribéreau-Gayon P., *Les Modalités de Mise en Oeuvre des Ecorces de Levure en Vinification,* Institut d'Oenologie, Université de Bordeaux II, 1984.
8. Lanaridis P. and Lafon-Lafourcade S., *Possibilité d'Emploi des Acides Octanoïque et Decanoïque comme Adjuvants à l'Ethanol pour la Stabilisation des Vins de Liqueur,* 1984.
9. Larue F., Geneix C., Lafon-Lafourcade S., and Ribéreau-Gayon P.; *Premieres Observations sur le Mode d'Action des Ecorces de Levure,* Institut d'Oenologie, Université de Bordeaux II, 1984.
10. Lonvaud-Funel A. and Joyeux A., *Formation d'Acides Gras et d'Esters Pendant la Fermentation Malolactique Influence des Ecorces de Levure,* Institut d'Oenologie, Université de Bordeaux II, 1984.

TWO NEW SOFTWARE TOOLS

FROM JAMES VAHL

THE GRAPE-GROWER'S DATABASE

manages information about your farming operation on a block by block basis.

THE WINEMAKER'S DATABASE

is a complete bulk wine information management system, customized to your needs.

Each of these products:

- ✶ runs on any hard-disk personal computer
- ✶ is solidly written, with consistent menus and commands, extensive error checking, full screen editing, real time data entry, etc.
- ✶ features powerful and flexible inquiry into the data
- ✶ comes with source code
- ✶ is professionally and personally supported

JAMES VAHL Ph.D. ENOLOGY CONSULTANT

Premium Winemaking, Winery Quality Control, Winery Design, Trouble Shooting and Computer Applications

707 963-5423

1361 ST. JAMES DRIVE, ST. HELENA, CA 94574

SEE Rohm Tech AT A.S.E.V. BOOTH 126

Over Seven Decades of German Biotechnology:

Enzyme Excellence.

So exacting that we can afford to be flexible.
We tailor our enzymes to your needs.

ROHAPECT®
For fruit juice and wine

VERON®
For baking

COROLASE®
For protein hydrolysis

ROHAMENT®
For cellulose breakdown

ROHALASE®
For starch hydrolysis

PLEXAZYM
Immobilized enzymes for hydrolizing lactose in whey and for producing L-amino acids

röhm

ROHM TECH INC.
10 East 40th Street, New York, NY 10016 Tel.: (212) 686-6166

Determining Vine Nutrients

Mike Marcley

"I don't try to maintain specific nutrient levels in my vines because there are so many variables such as soil type, climate and variety that affect these levels," says Jim Bundschu, president and vineyard manager of Gundlach-Bundschu Vineyards, Sonoma, CA. "It's hard to say which is optimum in a particular vineyard."

Recent research (Table I) has shown that basing a fertilizer program on the relationship of petiole and soil analyses to general recommendations for optimum nutrient levels in vines can be a mistake. A significant variation of NO_3 levels in petioles at bloom was noted in this research. It appeared that optimum nitrogen levels should be established for each vine variety.

Similarly, NO_3 levels in petioles were affected by climate. In warm weather (58-65°F), nitrates are readily assimilated by the vine, but in cool, cloudy weather, an enzyme (nitrate reductase) which allows the vine to use NO_3, remains at a low level, so nitrates can accumulate to toxic levels in leaves.

Pete Christensen, extension viticulturist, says that optimum nutrient levels determined from vines growing on sandy soils in hot regions such as Kearney Research Field Station at Parlier in the San Joaquin Valley or UC Davis may not apply to vines growing on heavier loam to clay-loam soils in cooler climates.

Vine appearance and crop condition are important factors to consider when determining optimum nitrogen levels and vineyard fertilizer programs for these cooler areas," adds Christensen.

Bundschu reports a variation in petiole nutrient levels at bloom among different vine varieties growing on essentially the same soil. "We did petiole analyses on 8-year-old Pinot Noir, Chardonnay and Gewurztraminer vines growing within 600 feet of each other on Huchica clay loam. Nutrient levels varied and nitrogen was low for all varieties, but the vines appeared healthy. (Table II)

"I look at the vines first and assess all the possible causes of any apparent growth problems before using petiole and/or soil analyses. Just blindly following analysis programs and applying recommended rates of fertilizers can cost a lot of money and sometimes there are no apparent benefits.

"For example, our Merlot is on a gravelly-loam soil between 28-36 inches in depth and had low petiole nitrogen at bloom,

Table I
Grouping of Grape Varieties by Bloomtime Petiole NO_3 Levels (Tentative)

Level	Wine	Raisin and Table
High	Malbec Merlot Grenache Tinta Madeira White Riesling Sauvignon blanc	Zante Currant Queen
Intermediate-High	Petite Sirah Emerald Riesling Chenin blanc Grey Riesling	Red Malaga Cardinal Muscat of Alexandria Emperor
Intermediate	Pinot noir (Gamay Beaujolais) Semillon Alicante Bouschet Rubired Ruby Cabernet Chardonnay Grignolino Zinfandel Palomino	Ruby Seedless Thompson Seedless Calmeria Exotic Italia
Low-Intermediate	Barbera French Colombard Gewurztraminer Pinot blanc	Tokay
Low	Sylvaner Salvador	Flame Seedless Perlette Ribier

Based on data from Peter Christensen (U.C. Kearney Agricultural Center, Parlier), Dr. Mark Kliewer (U.C. Davis), and Dr. James Cook (U.C. Davis).

Without your label it's only wine

You make wine; we make labels.
Together we make a difference.

BLAKE PRINTERY

Call or write for a brochure
2222 Beebee Street • San Luis Obispo, California 93401
In California Call Toll Free 800-792-6946
Outside California 805-543-6843

Table II
'78 Petiole Analyses (50% Bloom) of Gewurtztraminer, Pinot Noir & Pinot Chardonnay on Echuca Clay Loam*

Variety	N (ppm)	P(%)	K(%)	B (ppm)	Zn (ppm)
Gewurtztraminer**	550	3350	2.78	43.6	70.4
Pinot Noir	420	2600	2.09	46.4	56.8
Pinot Chardonnay	630	3125	2.48	51.6	49.0

* *Gypsum had been added to this soil at 2 tons/acre*
** *The top foot of this soil is more porous than the other, but it is still a clay loam.*

Table III
'81 and '82 Merlot Liming Trial
Petiole Analyses

	Control Rows	60 lb. $Ca(no_3)2$/acre	120 lb. $Ca(no_3)2$/acre
'82 NO_3N	284 ppm	688 ppm	284 ppm
'81 P	.11%	.19%	.17%
'81 Mn	288 ppm	256 ppm	230 ppm
'81 K	5.7%	5.20%	5.80%
'81 Ca	1.28%	1.38%	
'82 NO_3N	316 ppm	212 ppm	
'82 Ca	1.32%	1.48%	

Table IV
'81 and '82 Chardonnay Liming Trial
Petiole Analyses Results

	Control Rows	80 lb./acre	240 lb./acre
'81 NO_3N	1253 ppm	1445 ppm	2483 ppm
'81 P	.48%	.41%	.46%
'81 K	3.70%	2.90%	.0%
'81 Fe	51 ppm	47 ppm	34 ppm
'82 NO_3N	460 ppm	796 ppm	
'82 P	3.10%	?	

Table V
Greenacres Gamay Beaujolais and Gewurtztraminer
Petiole Analyses '81 - '83

	Gamay Beaujolais				Gewurtztraminer		
	N ppm	P%	K%		N ppm	P%	K%
'80	1450	.33	.76	'80	1300	.41	3.32
'81	5100	.42	2.0	'81	2000	.37	1.90
'82	790	.36	0.6	'82	1000	.32	1.20
'83	2500	.30	0.6	'83	1100	.41	1.64
'84	3250	.35	1.00	'84	1500	.57	2.62

so a consultant advised lime trials in 1981. These vines yield 3.65 tons/acre and produce fruit for our gold medal Merlot wines, so I was reluctant to do anything to them, but agreed to a trial.

"Our 14 acres of vines are all from the same clone of Merlot bench-grafted onto St. George rootstock planted in 1974. Calcium nitrate was applied to trial rows at 60 and 120 lb/acre. There were two buffer rows. Petiole analyses vary (Table III), but there was no detectable difference in each of the fertilized vines or in the crop.

"Our Chardonnay is another example. They are bench grafts on St. George rootstock planted in Huchica clay loam in 1972. I was persuaded to do a lime trial on these vines and applied lime at 3 and 10 tons/acre in February, 1981. We did petiole analyses June 4, 1981. I repeated the 80 lb/acre trial in 1982 to see if there was any further effect from the '81 trial even though there had been no visual difference in the vines or crop in '81. Again, there was no detectable difference in the vines or crop even though the analyses were significantly different. (Table IV)

"If I were more technically oriented, I might continue collecting and graphing these numbers, but I don't think it's worth it because there is no apparent effect on vines or crop. In this part of Sonoma Valley, the soils aren't deep or rich enough to support the larger canopies and alleged larger crops that extra fertilizer is supposed to produce."

Further evidence of variation in petiole nutrient levels at bloom due to variety or soil is provided by Dave Du Piero, vineyard manager at Sebastiani Vineyards. He observed that petiole NO_3 levels varied from 1,450 to 5,100 ppm during a four-year period for Gamay Beaujolais and between 1,000-2,000 ppm for Traminer grown on the same soil (well-drained, 6-foot deep, Zamora clay loam) at the Greenacres Ranch in Carneros (south of Sonoma). Petiole magnesium levels varied from 1.2-2.3 ppm in the Gamay Beaujolais and from 0.62-1.3 ppm in the Traminer (Table V).

"We have a 1978 planting of Chardonnay on a lighter, silt-

AWARD-WINNING WINEMAKER*
10 Years Experience
Winemaking/Winery Management

MERRY EDWARDS

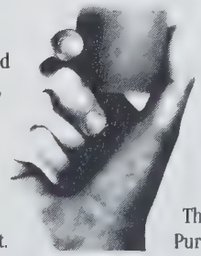
Winery Financial Planning ★ Facility Design
Government Relations
Wine Production ★ Computer Applications
Call (707) 526-4441 for Consultation

By Appointment Only

3333 Hartman Road
Santa Rosa, CA 95401

DON'T MAKE WINE WITHOUT IT!

Replacing your wooden bungs this year? Fabricated from high grade silicone, the Boswell bung easily outperforms its fir and redwood ancestors. The Boswell bung puts a stop to wicking and requires no pretreatment.



Easy to place and remove, the Boswell bung provides extra protection for your valuable barrels. Best of all, the Boswell bung's virtually infinite lifespan ends the problem of periodic replacement. The Boswell bung. Cost efficient. Pure and simple.

For more information contact The Boswell Company
36 Crane Drive, San Anselmo, CA 94960
415 · 457-3955

THE BOSWELL COMPANY

For that extra sparkle/Dicalite filteraids!

The world's leading wineries rely on Dicalite filteraids for brilliant clarity in their finest wines. In rough, polish and lees filtration, Dicalite filteraids can fit your most rigid requirements: diatomite, perlite, Solka-Floc® cellulose and Dia-Floc®.

Dicalite®
FILTERAIDS

GREFCO, Inc.
3435 W. Lomita Blvd.
Torrance, CA 90509
(213) 517-0754

Table VI
Vina Del Lago ('78 Planting) Chardonnay and Sauvignon Blanc
Petiole Analyses '81 - '84

Year	N (ppm)	P (%)	K (%)	Mg (%)
Chardonnay				
'81	706	.42	5.9	0.8
'82	1302	.29	2.9	0.7
'83	1700	.31	2.41	0.6
'84	4350	.35	2.59	0.53
Sauvignon Blanc				
'81	345	.26	3.7	0.5
'82	654	.57	3.1	0.7
'83	1150	.38	3.43	0.41
'84	2050	.30	1.45	0.46

Table VII
Soil Effect on NO_3N Levels in Chardonnay Petioles
West Sonoma Vineyard

Position	PO_4 ppm	NO_3N ppm	K	Ca	Mg
1983					
NE	5970	6000	0.6	2.1	.37
NW	6950	4300	1.3	2.2	.35
SW	6580	3500	1.1	2.2	.37
SE	6100	4800	0.9	2.1	.41
1984					
Position	NO_3N ppm	P%	K	Ca	Mg
NE	2670	.44	1.5	2.7	.38
NW	3140	.36	2.3	2.6	.36
SW	4570	.37	2.1	2.5	.39
SE	2960	.35	1.4	2.7	.41

loam than the Zamora clay loam," says Du Piero. "The vines yield 4 1/2 tons/acre and the petiole NO_3 varied between 700-1,800 ppm (1981-83). This is our Vina del Lago Ranch. Our Sauvignon Blanc, also a 1978 planting on the same ranch, had lower levels of NO_3 (400-1,150 ppm) for the same four-year period. (Table VI)

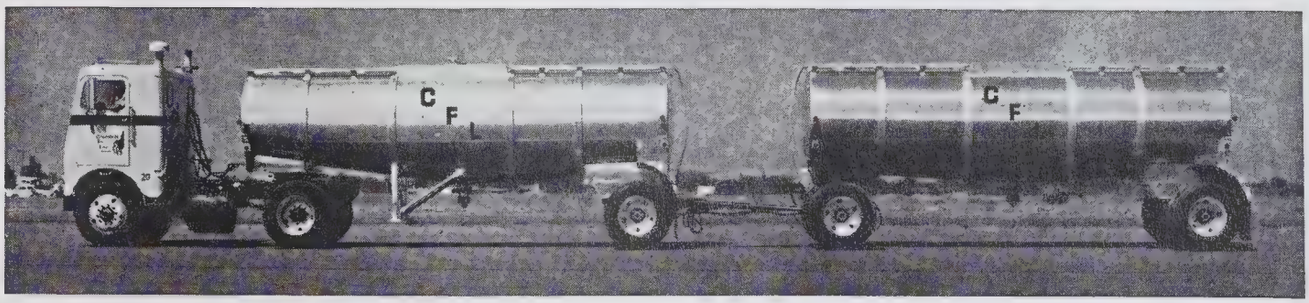
"We take petiole samples at bloom annually, and soil samples every fifth year, so we can build up a data bank for use in correcting specific growth problems, and to assist us in determining our own optimum nutrient levels. In some cases, our nutrient levels are outside the recommended range, but there is no apparent problem with the vines or crop.

"For example, potassium levels in our Gamay Beaujolais were below the recommended optimum (1.5-2.5%) in 1980, '82, '83, and '84 (Table V), but we're getting 5 tons/acre of good quality fruit from apparently healthy vines."

Bob Uttermohlen, provider of Water and Fertility Management Services, says there are different optimum nutrient levels for the north coast counties in California. "Petiole NO_3 levels, at bloom, of 2,000-3,000 ppm for Chardonnay yielding 4-5 tons/acre on rich, silt loam soils are not uncommon in

CHEROKEE TANK LINES

SERVING THE WINE INDUSTRY OF CALIFORNIA



SPECIALISTS IN TRANSPORTATION OF WINE & WINE PRODUCTS EXCLUSIVELY

For a Quality Ride for your Quality Wines, call

CHEROKEE TANK LINES

5463 Cherokee Road, Stockton, California 95205; Phone (209) 931-3573

this region. This is twice the recommended optimum for vines on sandy soils in a warm climate. The recommended optimum of 100-150 ppm for soil potassium is probably too low across the board and should be doubled for the clay loam soils in the Napa, Sonoma and Carneros regions.

"Both soil and petiole analyses are important when determining vine nutrient requirements. If you think you can fertilize a vine based on petiole analysis alone, you're only looking at part of the picture. You need to know the soil pH, Ca/Mg ratio and its relation to the soil potassium level. All of these relationships affect nutrient availability to vines.

"Generally, you want a 4:1 Ca/Mg ratio with potassium at 200-250 ppm to avoid problems with these nutrients. For example, in most high magnesium soils, if the ratio is as low as 2:1, petiole potassium levels will be low. Another reason for doing thorough soil analyses is that some nutrients like boron, can accumulate to toxic levels in layers (strata) of differing soil texture.

"For example, in 1982 some vines were discovered to be growing in a soil with a clay layer high in boron. In 1983, the vines were irrigated enough to keep this layer saturated and force the vine roots to find water and nutrients in the lighter soil that didn't contain much boron. There were no toxicity symptoms that year or in 1984. Petiole analysis alone would not have solved this problem.

"Zinc is likely to be deficient in most north coast soils, so levels should be monitored routinely. Similarly, nitrogen, phosphorus, potassium, boron and probably iron levels should also be monitored.

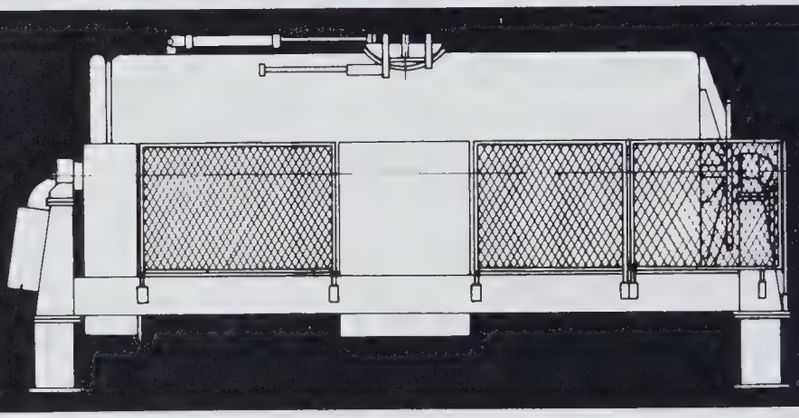
"Petiole nutrient levels for a given variety are affected by soil type. A western Sonoma vineyard of Chardonnay on a southeastern slope has brown loam over a hardpan at 2 to 2-½ feet in the northwest and northeast blocks. In the southwest block, the soil is a black clay loam over a hardpan at 2 feet. Soil in the southeast block is slightly heavier and the vines were noticeably more vigorous in early years.

SEE US AT THE ASE

BOOTHS 119 & 120

BUCHER

KLR



sano plast

KLR

PLUS a full range of selected Filtration and Bottling Equipment

KLR Machines, Inc.
47 West Steuben Street • (607) 776-4193
Bath New York 14810 • Telex: 510-252-1250

KLR Machines, Inc.
1925-B Francisco Blvd. East • (415) 456-4774
San Rafael, California 94901 • Telex: 380-753

Chardonnay bench grafts were planted here in 1980. Petiole NO_3 levels at bloom taken in 1983 and 1984 vary according to soil type and year (Table VII).

"Climate also has an effect on petiole analysis. For example, analysis results in 1982 and 1983 were inconsistent because excess soil moisture caused low soil temperature (50-60°F) from budburst through bloom. Soil temperatures below 55°F may have inhibited nutrient uptake. It may also have been limited by poor soil aeration because the soils were virtually saturated from budburst to bloom (Table VIII).

"1984 was probably the first season since 1981 that petiole analysis results were close to representing what was really available to the vines. Soil conditions were good for nutrient uptake as most soils were warmer—55-60°F, close to field capacity, and the vines weren't stressed. It was a good benchmark year for establishing norms."

There is no direct relationship between soil nutrient levels and vine petiole nutrient levels at bloom because vines utilize stored nutrients from budburst to bloom. Conditions that limit vine growth, such as poor soil aeration and low temperature (below 55-60°F), may limit utilization of the stored nutrients and be reflected in lower petiole nutrient readings at bloom.

Will Nord, vice president of viticultural operations, and Zach Berkowitz, vineyard manager, at Domaine Chandon agree that knowing each vineyard is important in determining vine nutritional requirements. Nord emphasizes the importance of getting soils in balance before relying too heavily on petiole analysis.

"Our Mt. Veeder Vineyard had unique problems due to soil variation," says Nord. "We did petiole analyses for several years up there, but the results were inconclusive. In 1981 we began a thorough soil and petiole analysis program and began to identify the problem.

"Initially, we planted 30 acres of Pinot Blanc between 1974-75 followed by 10 more acres in 1978. We began to plant Chardonnay with 19 acres in 1978, followed by 9 acres in 1979 and 10 in 1982. Pinot Blanc masks or can tolerate magnesium deficiency, so we didn't notice the typical marginal and interveinal chlorosis of Mg deficiency until 1980-81 when the Chardonnay vines were 2 to 3-years-old.

"Complete soil and petiole analyses confirmed this, as well as calcium and phosphorous deficiencies, as our main problems in this terraced 10-20% slope vineyard. The soil varies from a 3-foot deep loam at the lower part of the terraces, to 12-18 inches of decomposed shale over hard clay on the upper part. Nutrient deficiencies are more pronounced in this decomposed shale.

"Since we began correcting these deficiencies, the vines have apparently responded because yields for both Pinot Blanc and Chardonnay have increased since 1981 (Table X) and the foliar symptoms of Mg deficiency have disappeared. The response is not entirely due to changes in fertilization. Increased yields may be largely due to the 6-8 bud whip canes we've been leaving on the normally cordon-trained, spur-pruned vines."

"In about five more years, when we have corrected our soil problems, we'll 'fine-tune' the vines by using petiole analysis results to assist in making minor adjustments to our fertilizer program. Petiole analyses are done every year, and soil analyses are done yearly in problem areas and every other year in non-problem areas, to build a data base for future use in predicting vine needs during critical growth periods such as budburst to bloom. Our major concern is good preplant soil analyses and pH correction. For example, soil pH at our Carneros Ranch was 4.5 5.5, so we added 2 tons/acre of lime every other year to adjust the pH to 6.0."

"Our Pinot Noir and Chardonnay consistently give 4-5 tons/acre and Pinot Blanc produces 3-4 tons/acre with aver-

Table VIII
Soil Temp (°F) and Moisture Status (Neutron Probe)
Mr. Alexander 1983

Sample Date	Temperature (°F at 5' deep)	Moisture Content*	Inches of Water/Foot of Soil (Sample depth)
3/14	56°	4.23	1'
		4.42	2'
		4.43	3'
		4.21	4'
		4.34	5'
4/11	57°		
5/4	57°		
5/11	57°	4.04	1'
		4.40	2'
		4.50	3'
		4.16	4'
		4.39	5'
5/18	59°		
5/25	61°		
6/1	62°	3.62	1'
		4.35	2'
		4.39	3'
		4.19	4'
		4.25	5'

* *This soil was saturated at a reading of 4.2 on the neutron probe.*

Table IX
Pinot Blanc Tissue Analyses
1980 - 1984

3V = block 3, vigorous area
3NV = block 3, non-vigorous area
AVG = average value for Pinot Blanc in a given year (incl. 3v and 3nv)

1984

Sample	NO_3N ppm	P%	K%	Mg%	Ca%	Zn%
3V	900	.29	2.52	.69	2.12	73
3NV	1350	.31	2.29	.66	2.01	70
AVG	1107	.28	2.62	.55	1.85	69

All samples done by Harris Labs

1983

Sample	NO_3N ppm	P%	K%	Mg%	Ca%	Zn%
3V	711	.32	.9	.7	1.88	56
3NV	401	.34	1.0	.7	1.96	59
AVG	456	.35	1.3	.6	1.87	55

All samples done by Scientific Ag. Services

1982

Sample	NO_3N ppm	P%	K%	Mg%	Ca%	Zn%
3V	963	.44	2.0	1.0	2.24	73
3NV	1360	.34	1.4	.9	2.06	62
AVG	357	.35	1.7	.8	2.18	67

3V and 3NV were done by S.A.S. and all others by Harris Labs.

1981

Sample	NO_3N ppm	P%	K%	Mg%	Ca%	Zn%
3V	1750	.28	1.91	.79	1.92	54
3NV	1450	.27	1.36	.79	2.00	57
AVG	1483	.28	1.62	.81	2.03	55

All samples done by Harris Labs.

1980

Sample	NO_3N ppm	P%	K%	Mg%	Ca%	Zn%
3V	690	.37	2.14	.76	1.96	85
3NV	690	.29	1.70	.62	2.00	66
AVG	952	.34	1.80	.64	1.96	66

All samples done by Harris Labs.

Table X
Mt. Veeder Pinot Blanc and Chardonnay Yields '81 - '84

	Pinot Blanc Planted in '78	Pinot Blanc Planted in '79	Chardonnay Planted in '78	Chardonnay Planted in '79
'81	3.4 tons/acre		1.4 tons/acre	
'82	4.0 tons/acre	1.9 tons/acre	2.9 tons/acre	1.9 tons/acre
'83	3.8 tons/acre	3.3 tons/acre	2.9 tons/acre	3.0 tons/acre
'84	4.1 tons/acre	4.0 tons/acre	4.0 tons/acre	4.0 tons/acre

age harvest composition of 17-19° Brix, 1.1-1.3 TA and 2.95-3.15 pH on these soils," reports Berkowitz.

"In some cases, there is no apparent solution to vine growth problems," adds Berkowitz. "There is a section in an 18acre block (Block #3) of Pinot Blanc at our Carneros 3 Ranch that has always been less vigorous than the rest of the block. The vines were weaker during training, struggling to get up the stake while other vines were being trained to cordons, and have only recently begun to catch up.

"We checked for nematodes and phylloxera, dug holes to check the soil structure, and have soil and petiole analyses since 1980, but still haven't found a cause for this non-vigorous situation. The block was planted in 1974 with benchgrafts on AXR rootstock in soil that is 2 - 2 1/2 feet of haire clay loam over a heavy clay.

"We're building up a good nutrient data base to compare this block with the average data from our 150 acres of Pinot blanc (Table IX), but the answer doesn't appear to be in vine nutrient status. You can't run a vineyard from your desk by relying too much on numbers.

"For example, we've recently found vine roots that are growing into what we thought was impervious clay at 2 - 2 1/2 feet. Maybe this or other soil conditions caused the original problem or will help vines grow out of the non-vigorous condition," he suggested.

Critical vine nutrient level tables are often determined by experimental work done in soil and climatic conditions that differ significantly from those of the commercial vineyards for which they were intended. The book may have to be re-written for these vineyards, with each manager determining new critical nutrient levels for his own vineyards by relating petiole and soil analyses results of fertilizer applications to vine performance.

In exceptional cases, like the Gundlach-Bundschu Vineyards, that have been in the same family for generations with everyone practically knowing the vines by name, the book is already in their heads.

INDCO

Industrial Chemical Company of San Francisco, Inc.

WINERY PRODUCTS

BENTONITE • BLEACH • CARMEL
CARBONS • CALCIUM HYPOCHLORITE
CASEIN • CITRIC ACID • CREAM OF
TARTAR • DE-CELATOMS • PRE-CO-FLOC
FB CLEANER • LIME CHLORIDE
GELATIN • GLYCOL • MALIC ACID
NULOMOLINE • POTASSIUM
METABISULFITE • SODA ASH
PHOSPHATES • POLYCLAR AT
POTASSIUM SORBATE • SULFUR WICKS
TARTARIC ACID • VINTNERS SPECIAL

SAN FRANCISCO (415) 822-5070
FRESNO (209) 268-4571

2655 Ingalls Street
SAN FRANCISCO, CALIFORNIA 94124

A. Bellagio Wood Tank Co., Inc.

QUALITY YOU CAN SEE!

Manufacturer of Redwood Tanks 300 to 15,000 Gallons

American White Oak Tanks Available
Write For Our Free Price List

For Water Storage • Fire Protection Drip System • Hot Tub • Wine Aging

MAILING ADDRESS
12786 Old Redwood Hwy.
Healdsburg, CA 95448

SHOP LOCATION
Grant School Road
(707) 433-4605

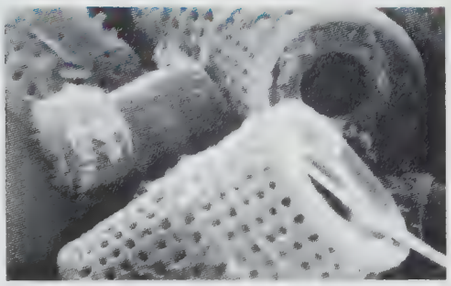
SEE US AT A.S.E.V. BOOTH 223
SEE Eagle-Picher AT A.S.E.V. BOOTHS 134-135

Vintners 'round the globe choose Celatom

Diatomite Filter Aids for ultimate clarity

Of the various grades of Eagle-Picher CELATOM Diatomite Filter Aids produced to serve most commercial filtration operations, one grade, CELATOM FW-S, provides *ultimate clarity* for wine filtration. This grade, *formulated specifically* for the wine industry, provides *longer filtration cycles* and *faster flow rates* when used to filter unfermented "free-run juices" and lees.

CELATOM FW-S Filter Aids are composed of fresh water diatoms mined from virtually inexhaustible deposits in Nevada. The vast majority of these diatoms are the species Melosira Granulata, resulting in a uniformity ideal for forming firm precoats on



Scanning electron microscope photo of Melosira Granulata Diatoms, magnified approximately 3000 times

rotary vacuum precoat filters with a minimum of cake-cracking or sloughing off. These unique diatoms are harder, stronger, and more "crush-proof" than ordinary diatoms; and, on pressure filters, are less apt to penetrate into filter screens and reduce throughput, thereby yielding easier screen "clean-off" properties and extended filter life. CELATOM FW-S Filter Aids "stay put" to do the job they are formulated to do!

If you are faced with a filtration problem, talk to Eagle-Picher filtration engineers now so you have a sound, economical solution before the situation becomes a costly, time-consuming problem. Chances are, we already have the solution because of our world-wide experience.

Write today or phone collect for these two free brochures on the use of *CELATOM Diatomite Filter Aids in Filtration Systems* and on *The Economics of Bulk Shipments of CELATOM Filter Aids*. You'll find them helpful and authoritative!

EAGLE-PICHER INDUSTRIES, INC.
Minerals Division, 580 Walnut Street
Cincinnati, OH 45202 • Phone: (513) 721-7010

New Protein Removal Process

Dr. William A. Welsh and Dr. Yves O. Parent

A new continuous heat-stabilizing process for the wine industry is being developed by the Davison Chemicals Division of W.R. Grace & Co. This technology offers several advantages to winemakers:

- *Heat stabilization on a continuous basis and at process flow rates*
- *Large reduction in wine losses*
- *Elimination of bentonite lees and the cost associated with processing lees*
- *Adsorption of heat labile proteins without affecting color*

Furthermore, independent tests have found no significant changes in the wine's chemical or sensory characteristics. These tests included measurements for pH, alcohol, total acid, total phenols, SO_2, sodium, potassium, calcium and color.

A Special Fining Media

It is generally accepted that proteins are one of the sources of instability in wines. In a typical bentonite fining process, proteins are removed in a batch-type system operation. The bentonite is added (as a slurry) to the wine and adsorbs proteins and various other components as it slowly settles in the tank. The fined wine is then decanted and the lees further processed prior to disposal.

The Davison Chemical Division of W.R. Grace & Co., Baltimore, MD, is taking a different approach. Calling upon its expertise in designing and developing specialty adsorbents and processes for their use, the company has developed a Continuous Wine-Fining Process, based on a unique fining media to be used in a continuous flow, column type unit operation.

The adsorbent material is a proprietary synthetic hydrated alumino-silicate designed to have a special affinity to adsorb heat-labile proteins. The adsorbent is synthesized and processed in such a way that the nature and geometry of the structure can be controlled to achieve the appropriate pore size and surface characteristics to allow the diffusion and adsorption of the proteins in wine.

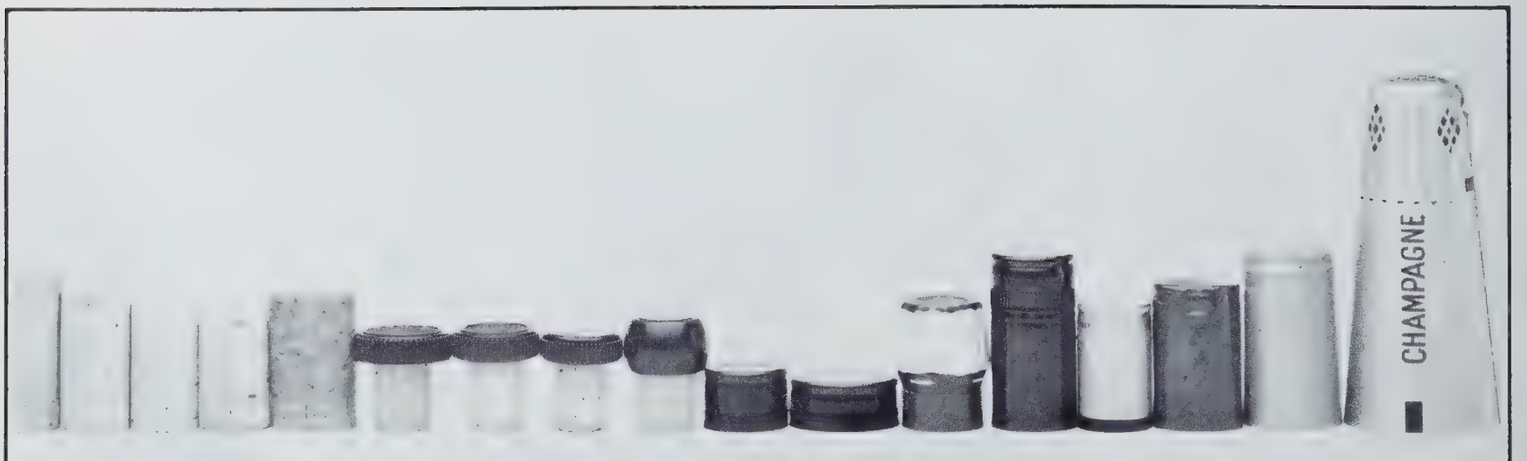
Adsorbent particles are similar to small rigid sponges (see diagram 1). The channels or pores are wide enough to accept proteins. Because there are so many such pores, there is a tremendous amount of channel-wall, or surface area available for protein adsorption. A typical adsorbent may have 450 square meters of surface area per gram of material. Because the fining media are synthetic they can be designed to selectively sorb heat-labile proteins. As a result, the wine retains more of its original color. The adsorbent meets the criteria for 'fining agents' as described by the BATF in the Federal Register, 9/24/84.

The System

The Davison system is based on the principle of utilizing a single adsorbent in a flow-through unit operation. The wine is fed to a column (vessel) through which it passes in a continuous fining process.

The principle behind this method of fining is that of maximizing the use of the adsorption potential of the fining media for heat-labile proteins. For example, this goal can be achieved by intimate contact of the wine and the adsorbent in a 'packed bed' column configuration (refer to diagram 2). In such a system, between inlet and outlet of the vessel, the wine gets to 'see', in succession:

- a first section, where the adsorbent has essentially no more capacity to adsorb the protein (has exhaused its potential);
- a second section, where the effective removal of the



International Closures & Supplies

415/483•3750

SAN LEANDRO • CALIFORNIA

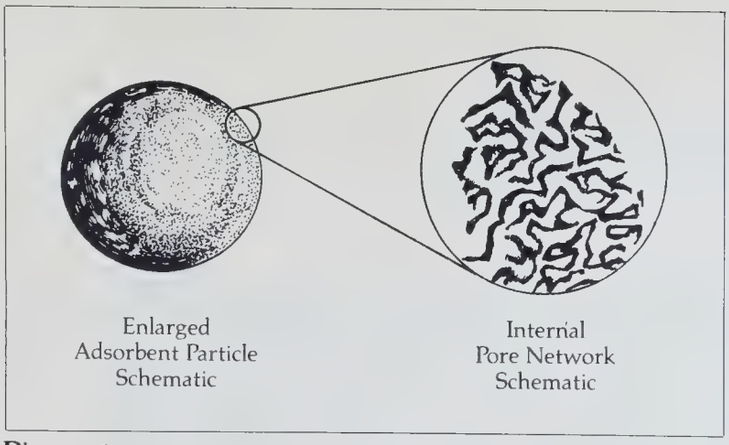


Diagram 1

proteins contributing to heat instability takes place (that is, the wine goes from its unfined state to the desired fined state, utilizing the full potential of the adsorbent);

• finally, a third section, where the fined wine is in contact with fully active adsorbent but where no further exchange, between wine and fining media, occurs.

Since the process is continuous, the position and/or relative size of these three sections will vary with processing time. Indeed, as more wine is being processed, the portion of the bed which is exhausted will increase in size, the portion through which the essential exchange takes place will not vary in size too much, but will instead 'migrate' towards the outlet end of the bed reducing the effective size of the third fully active section. The operation of the system would then

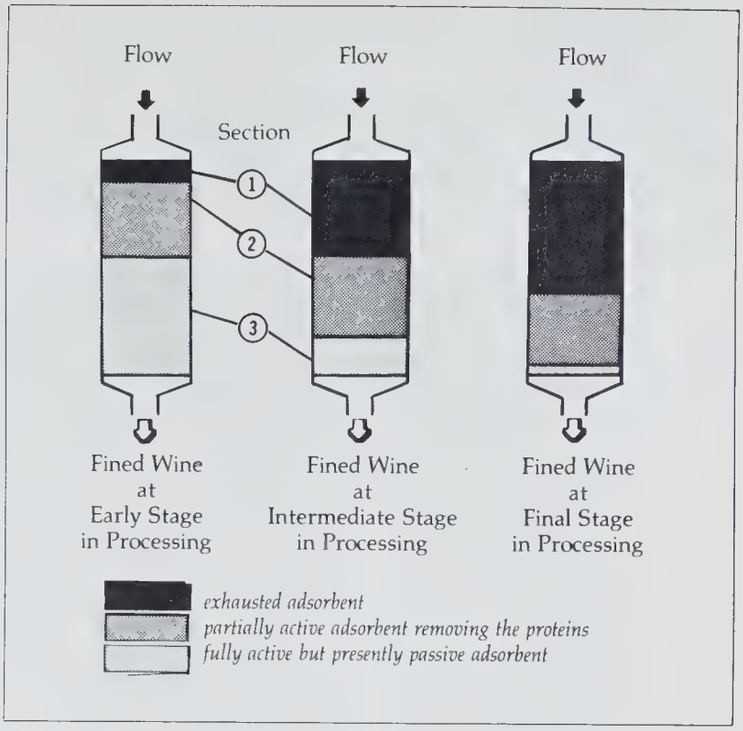


Diagram 2

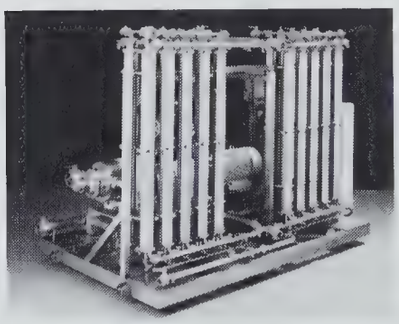
be completed and the adsorbent readied for regeneration at the time when the third section no longer exists. Given that at least two such columns are present, the untreated wine can be fed to the second unit while the first one is 'regenerated,' thus insuring a complete continuous fining operation.

Millipore ultrafiltration helped Lohr Winery harvest gold and silver.

"We invested in our Millipore Process UF System in 1982, and we couldn't be more pleased with the results.

"A non-vintage J. Lohr Cabernet Sauvignon, containing 40% ultrafiltered wine, won a gold medal in its class at Orange County and a silver medal at the American Wine Competition. And our 1982 Johannesberg Riesling won silver medals at the 1983 Orange County and Riverside Fairs."

–Barry Gnekow, Winemaker



In the typical Millipore ultrafiltration system pictured, oxidized and polymerized phenols, heat-unstable proteins, yeast and microorganisms can be removed in a single step. And ultrafiltration produces a 5% higher yield of high-quality product wine than with fining and traditional filtration techniques.

For more information on Millipore Process UF Systems, call our Technical Services Department toll-free at 800-225-1380 (in Massachusetts, dial 617-275-9200) or write Millipore Corporation, Bedford, MA 01730.

MILLIPORE

SEE US AT A.S.E.V. BOOTHS 187-189

Table 1

Sample	Alcohol % by volume	Titratable Acidity gm/100 ml	Total pH	Free/Total SO_2, Ripper mg/L	Total Protein[1] mg/L	Phenols mg/L (GAE)	Sodium mg/L	Potassium mg/L	Calcium mg/L	Color 420/520	Heat Stability[2]
BX-1	9.55%	1.020	3.25	23/87	9	238	73	910	117	.086/.055	Stable
BY-1	9.45%	1.058	3.19	23/96	13	249	68	930	119	.094/.056	Stable
BX-2	10.95%	0.600	3.75	30/146	8.5	287	63	1410	124	.108/.058	Stable
BY-2	11.2%	0.615	3.75	27/154	29.5	316	52	1440	119	.128/.061	± ?
BX-7	11.45%	0.630	3.57	21/114	7	281	28	1290	102	.122/.066	Stable
BY-7	11.55%	0.653	3.60	25/131	15	311	41	1270	99	.129/.063	Stable
CX-4	11.75%	0.705	3.52	80/161	7	273	30	1010	100	.117/.057	Stable
CY-4	11.85%	0.720	3.58	80/161	9	272	24	1000	98	.123/.058	Stable
EX-10	13.55%	0.653	3.37	29/91	44	274	30	790	70	.150/.067	Stable
EY-10	13.4%	0.660	3.39	31/96	44.5	285	16	800	69	.156/.066	Stable

Winery: B, C, E

Treatment: X = Bentonited; Y = Davison System Fined

Variety: 1 = Chardonnay; 2 = Chenin Blanc; 4 = French Colombard; 7 = Dry Muscat; 10 = Sauvignon Blanc

[1] *Bio Rad Assay Method*

[2] *Sample heated for 24 hours at 60° C; refrigerate, - 4° C for approximately 1 hour or until sample reaches room temperature. Evaluate with high intensity light-heated sample vs. control (unheated; membrane filtered).*

The Trials

Independent tests performed in November, 1984 throughout California, showed no significant differences between wines fined by the continuous flow system and the conventional bentonite batch-type process. These tests were conducted on-site with Davison's bench-scale fining system (see photograph) on 5 gallon wine samples of 13 different varieties, 23 wine samples in all. The size and processing capacity of the bench scale system was selected based on the average protein concentration for a representative group of wines that had been previously analyzed. Several samples of wine processed during the trials showed protein concentrations well in excess of the assumed average. This resulted, for such samples, in a premature exhaustion of the bed and subsequent failure to meet the heat stability requirement.

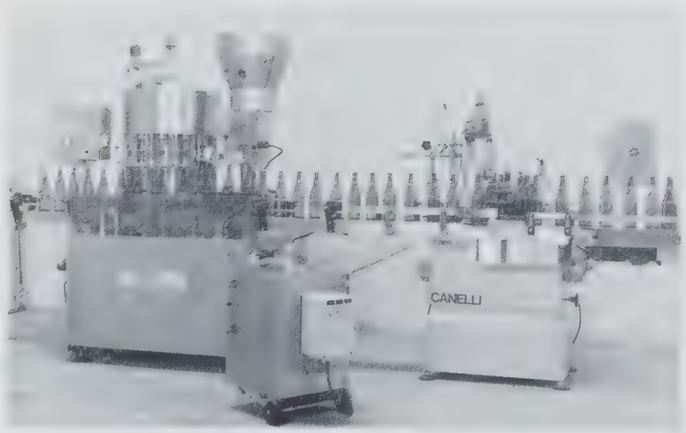
Physical/chemical analyses were conducted by Vinquiry, Winemakers Services and Research Laboratory, Healdsburg CA and sensory evaluations were conducted at the University of California, Davis. The wines and wineries solicited were selected to encompass the full range of wineries and climatic regions of California.

Overall, Vinquiry's data (see Table 1 for a representative sample of these evaluations) showed comparable results from both fining techniques. It should be noted, however, that system-treated wine generally had (retained) slightly higher levels of total phenols as well as greater color. At UC Davis, under the direction of Professor Ann Noble, a duo/trio difference test was conducted, comparing Davison treated

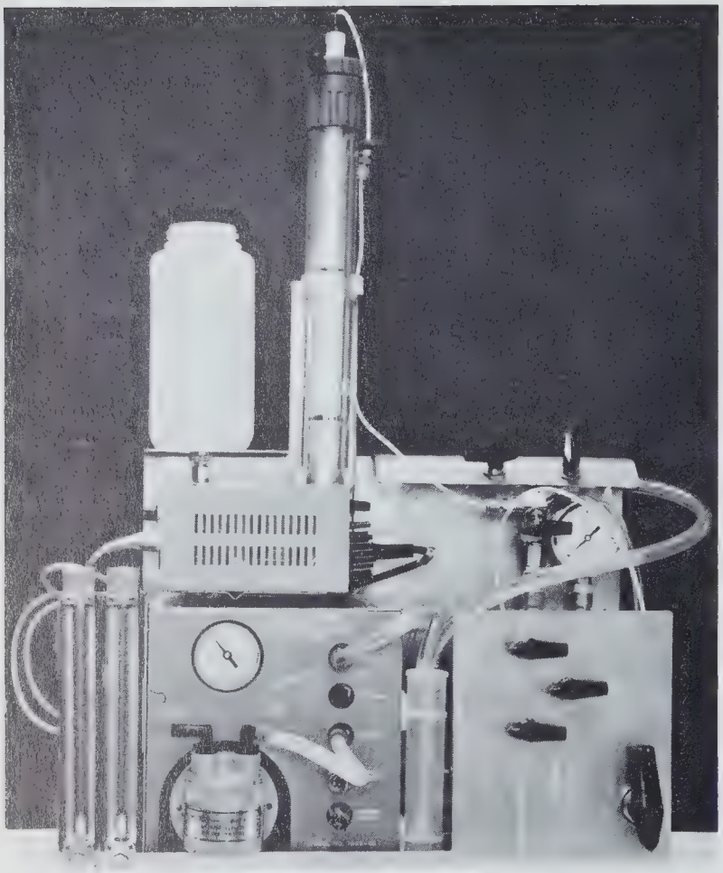
Fischer & Schug
Winery Equipment

Rauch Stemmer-Crusher
Membrane Presses
Plate and Lees Filters
Schneider Pumps and Mixers
Semi-Automatic and Automatic
Bottling Equipment

Please inquire about Used Winery Equipment
Sales, Parts & Service
940 Dowdell Lane/P.O. Box 556
St. Helena, CA 94574
(707) 963-7000



Bottling Line Installed at Whitehall Lane, St. Helena, CA



The Davison bench-scale fining system

Table 2
Sensory Test Results
University of California, Davis
Professor Ann Noble

Results of Duo-Trio Difference tests comparing Grace treated wines versus those fined with bentonite (n = 15).

Winery Code	Variety	Number of Correct Responses [a]	Signif-icance [b]
† B	1-Chardonnay	5	NS
B	2-Chenin Blanc	9	NS
C	4-French Colombard	9	NS
B	7-Dry Muscat	10	NS
E	10-Sauvignon Blanc	8	NS

[a] *A correct response corresponded to selecting the sample which was different from the reference.*
[b] *NS indicates no significant difference.*
† *Pair served in black glasses.*

wines with those treated with bentonite (Table 2). Consistent with other findings, no significant differences were found between the wines fined with the two processes.

Future

Davison is considering a novel approach to this development. That is, rather than have wineries purchase the required fining equipment—which could be prohibitive to small-volume wineries—it is considering a leasing agreement. This would allow wineries to lease the system (including fining media) on a 'per-gallon fined basis.' Now that the bench-scale testing has demonstrated the applicability of Davison adsorbents in the fining of wine, the next step will be semi-commercial size plant trials in at least three wineries. The goal is to heat stabilize 1,000-3,000 gallons of wine through the fining media before regeneration is required. The system will process 150-200 gallons/hour.

These trials will allow the company to accumulate additional data, as well as gain valuable information concerning scale-up procedures and problems. There is an ongoing research effort to separate and identify those protein fractions causing heat instability. Furthermore, work is continuing in the development of a 'quick-test' to measure fining effectiveness.

Davison's program is to have their fining system commercially available as early as Fall, 1986. A technical paper will be presented on this subject at the upcoming ASEV meeting in Reno, Nevada. Copies of the complete evaluations are available to interested parties.

MEL KNOX
Barrel Broker

Francois Frères of Burgundy
Tonnellerie Taransaud of Cognac

- New barrels of all sizes
- Tanks
- Used cooperage

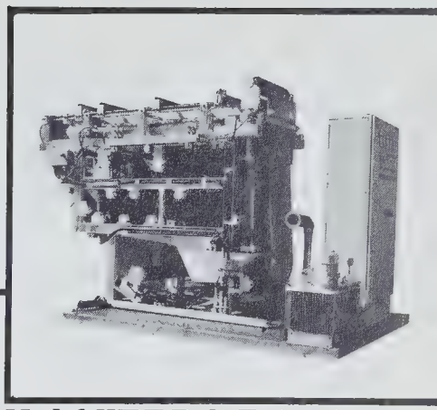
1229 Third Avenue
San Francisco
California 94122

415-661-3413
415-661-1616

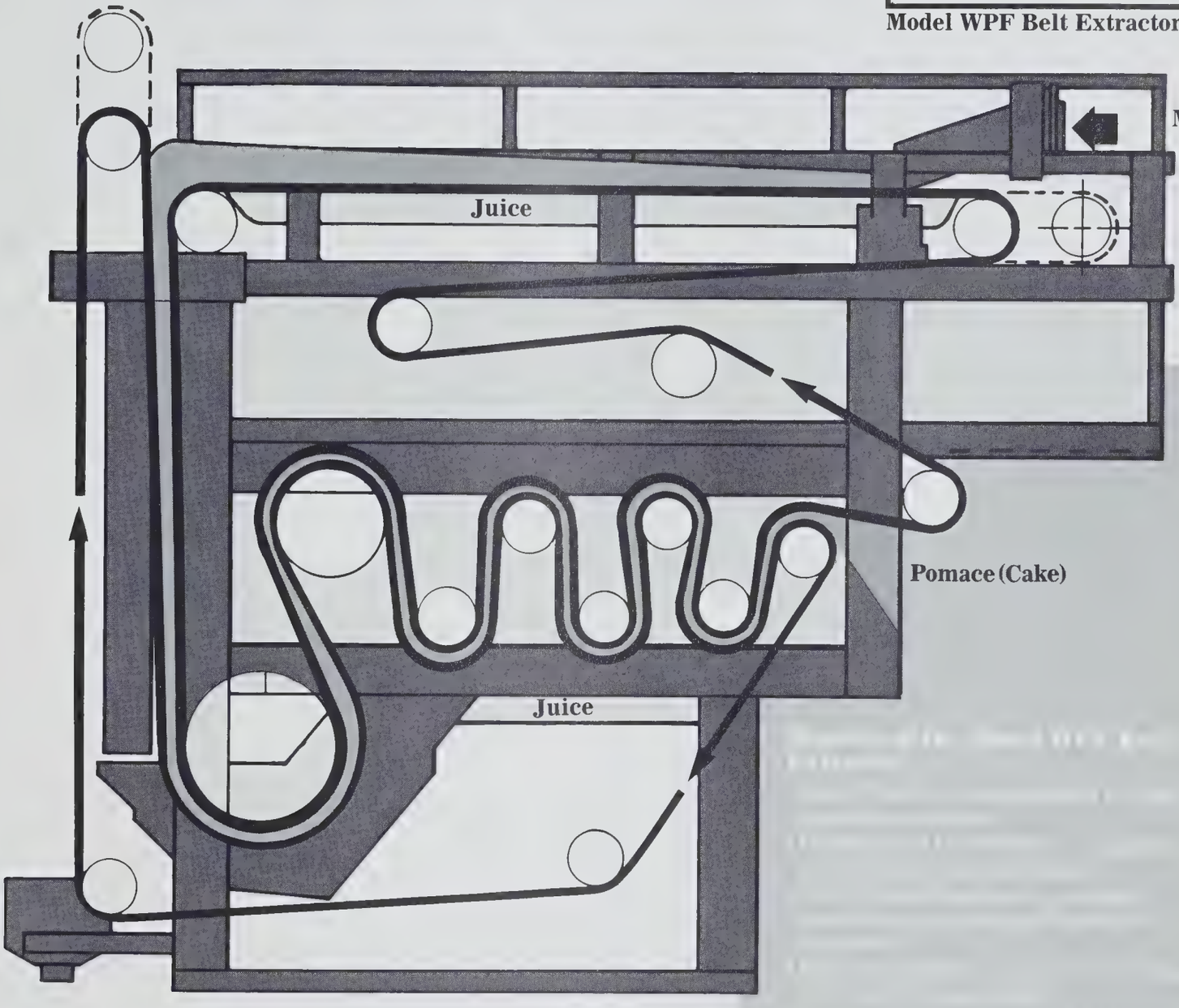
PRACTICAL WINERY
is a must!
Subscribe Now!
15 Grande Paseo
San Rafael, CA 94903

Continuous Operation No Fillers Required

A better method for juice extraction



Model WPF Belt Extractor



Ashbrook Simon Hartley, a leader in the manufacturing of belt filter presses, introduces a real breakthrough in juice extraction, the Model WPF Belt Extractor.

The Belt Extractor offers two advantages over conventional batch processes. Simultaneous feed and discharge allow for continuous operation and automation, while the need for expensive fillers is eliminated.

Representative inquiries welcomed

SEE US AT A.S.E.V. BOOTH 190

Creating A Microclimate

Pat Summers

C.A. (Andy) MacGregor's basic premise is that today's vineyardist must make his own weather, create his own microclimate, and be able to work in a more sophisticated style than in years past. Faced with low yields caused by cool spring weather in Edna Valley, San Luis Obispo, CA he has researched his problem, and come up with a promising solution.

"Our records begin with the fourth leaf in 1979. That year we had a good size crop. In 1980 we got only about 53% of what had been expected, in 1981 about 80%, and in 1982 about 75% of what we expected. You go to the winery and tell them they can expect 100 tons, and in a year like 1980 you only bring them about 50 tons. Then you have some explaining to do—and you have to do some explaining to your banker too. Both those people say, 'What in the hell are you doing?"

After the '81 crop MacGregor began serious investigation of the problem. In researching the literature he found many clues, and good background information but nothing that addressed the problem in sufficient detail to be directly applicable. What he did know for sure was, "The 1980 crop had small, low weight clusters containing small berries with no hard seeds."

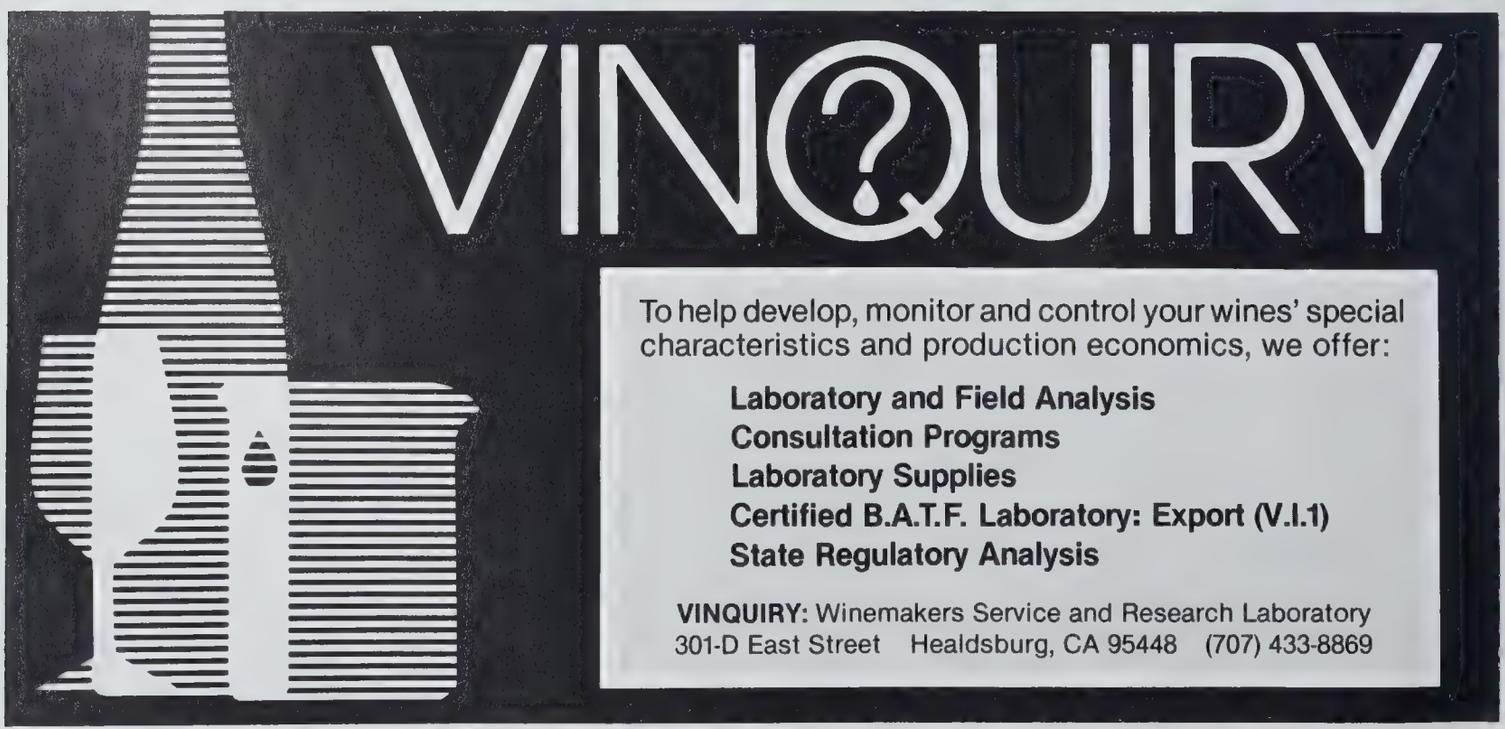
According to a paper published in the 1983 Oregon Horticultural Society Proceedings, *Physiology of Cluster Formation and Fruit-Set in Grapevines* by W. M. Kliewer and C.A. MacGregor, "The main climatic factors that influence fruit cluster formation are light intensity, photoperiod, total light energy, temperature, water stress and mineral nutrients." MacGregor's contention is that temperature is what is amiss in his vineyard. Specifically he has formulated a concept that, as stated in a paper accepted for publication by the *Journal of Enology and Viticulture* and presented at the 1983 meeting of ASEV, "A time 'Growth Window' exists for a critical pollination and/or set process which is temperature dependent. It is hypothesized that the critical process is the growth of the pollen tube following pollination." (See chart.)

MacGregor had a previous career as an engineer in research and development. When the jet age began, MacGregor found a lack of classes and textbooks on the subject—he had to educate himself. Soon he was writing engineering textbooks for the coming generation. Later he worked with rockets. Again, working in uncharted waters, he wrote texts. To date he has written 15 technical publications in those fields. Today, as a vineyardist, he finds the same excitement he did pioneering research with jets and rockets, and for much the same reason. His natural investigative sense led to an ASEV paper.

Crop Size Temperature Dependent

MacGregor's investigation shows a correlation between the temperature during the pollination, or set period, and the resulting seeded berries. A grape may have 0-4 seeds, and it is known that there is a direct relationship between the number of seeds and berry size. Grape seeds are known to produce hormones that stimulate berry growth. According to MacGregor's data, the number of berries/cluster in his vineyard remains about constant from year to year. The difference in crop size is caused by the difference in the weight of the clusters.

"The striking effect of temperature during the pre-bloom and bloom period on fruit-set, ovule fertilization and berry development is illustrated in recent data collected for Char-


VINQUIRY
To help develop, monitor and control your wines' special characteristics and production economics, we offer:
Laboratory and Field Analysis
Consultation Programs
Laboratory Supplies
Certified B.A.T.F. Laboratory: Export (V.I.1)
State Regulatory Analysis
VINQUIRY: Winemakers Service and Research Laboratory
301-D East Street Healdsburg, CA 95448 (707) 433-8869

SEE Miles Laboratories AT A.S.E.V. BOOTH 34

COUNT ON MILES
for citric acid and enzymes for the beverage industry

Miles puts biotechnology to work to create new and better solutions to beverage processing problems. By utilizing scientific research and human resources, we open new avenues of applications for citric acid and enzymes. The result is innovative beverage products for today's competitive market.

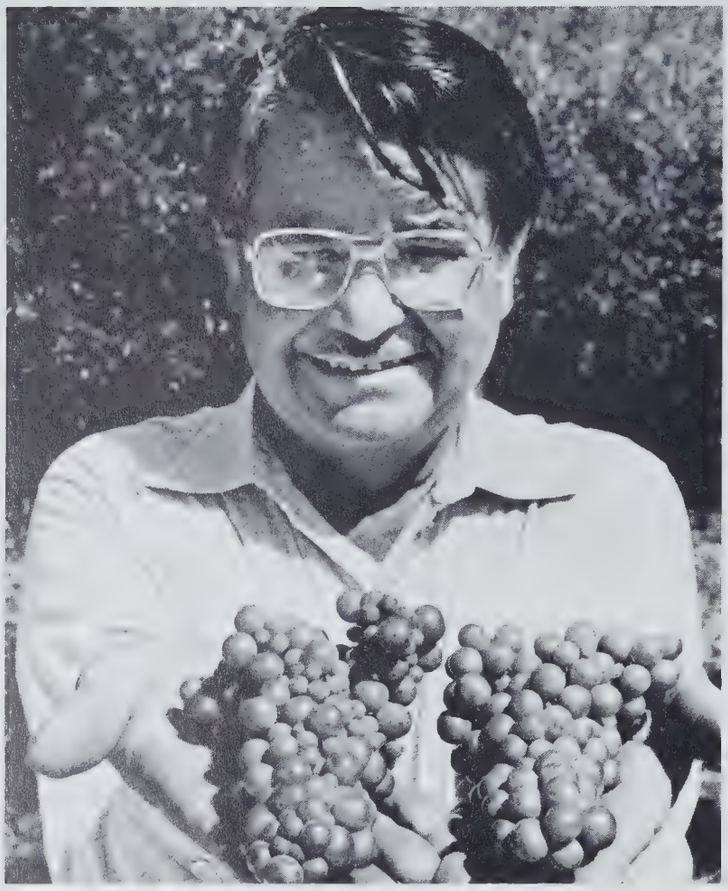
At Miles, we have established a tradition of working closely with our customers in developing practical formulations that work for their products and processes. And we back up that tradition with the kind of service and production controls that assure prompt delivery of consistent quality citric acid and enzymes.

Miles has a legacy of innovation in the beverage industry. Count on us as your partner in producing the beverages of the future today.

Biotech Products Division,
Miles Laboratories, Inc., P.O. Box 932, Elkhart, IN 46515-0932 Phone: 800 348 7414

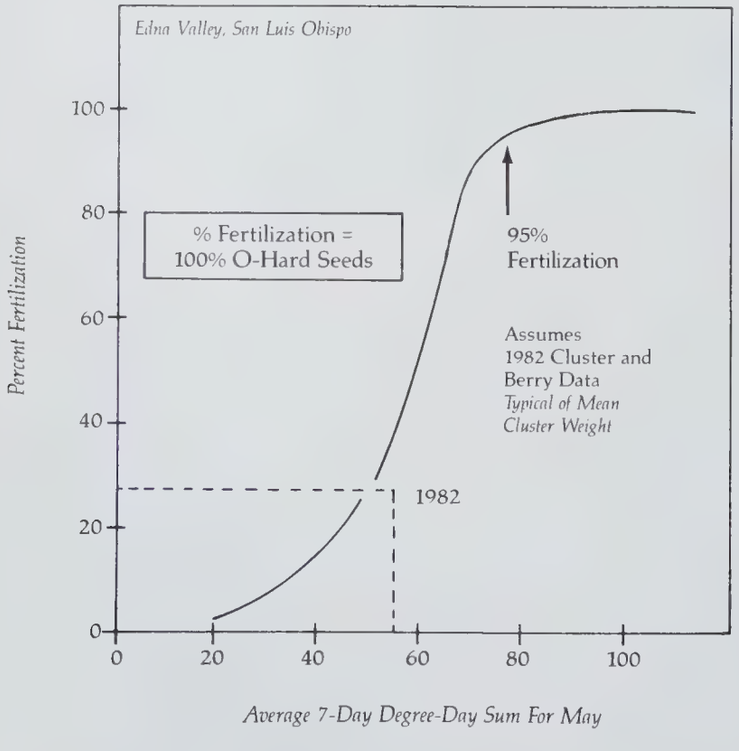
MILES

©1985 Miles Laboratories, Inc. A-11077 1/85



MacGregor shows the results: cluster on reader's left shows shot berries; cluster on reader's right shows full cluster

donnay in the San Luis Obispo area. These data show that when the degree day heat summation and the average seven-day heat summation for the month of May in 1979 were 320 and 75.6 respectively, cluster weights were more than double the 1980 cluster weights when monthly heat summation and seven-day heat summation were 186 and 40.7 respectively."



(*Physiology of Cluster Formation...* W.M. Kliewer and C. A. MacGregor)

"The grapes will flower, they will open and the calyptra will come off, and the pollen sits up there on the stigma and gets on the part that it is supposed to. There is a pollen tube that grows from where the pollen grains hits the stigma, down into the ovules," says MacGregor, reviewing the basic physiology of fertilization. "If it isn't warm enough, that pollen tube doesn't grow far enough to reach the ovules themselves." MacGregor observes that if the pollen tube does not grow down into the ovary of the berry within the critical seven days, the 'Growth Window', it will not do so later. "Grapes are like anything else, there is a certain time for things to happen, if they don't happen in that time, then the plant moves on to the next phase. If it doesn't get fertilized, you still get the berry, but you get a shot berry, one that weighs maybe a fifth or a sixth as much as the fertilized berry."

The data MacGregor gathered shows, as he states in his paper, "The average 7-day Growth Window temperature is very critical. A difference of average daily temperature of 3°F (from 57°F to 60°F) results in over a 2 to 1 difference in mean cluster weight. 75 degree days are required to achieve 95% fertilization. Even a small percentage of the berries having 0-hard seeds substantially reduces the cluster weight; *i.e.* 5% 0-hard seed berries reduces the cluster weight over 20%."

MacGregor is certainly aware of the contention that shot berries are superior to those with two hard seeds, but he is convinced that the theory is wrongly held. "Some hard data has come out of Switzerland. Working with Chasselas, they made wine out of the shot berries and they made wine out of one or two hard-seeded berries, and the wine that was superior was made out of one or two hard-seeded berries." MacGregor has done a similar experiment with his own grapes. Late this summer he will offer Chardonnay for a comparative tasting; same vintage, same vineyard, one made from shot berries and the other from two seeded berries. Several winemakers have participated.

Creating A Greenhouse

MacGregor developed a plan to keep the forming clusters warmer. To achieve a 'greenhouse' effect, he wrapped the vines in plastic. (MacGregor contacted various firms making plastic film that could be used as a wrap.) Using a forklift mounted on the rear of a tractor, he unrolls these sheets, about 6 to 9 feet by 500, onto the vines. The hard part was to find exactly right material, and to figure out how to hold it there. Various methods have been used to affix the plastic: the plastic has been stapled through popsicle sticks to the wooden stakes; he has stapled the plastic together under the cordon wire. He has tried using green tape around the wires, enclosing the vines and tying the whole thing at intervals like a giant sausage. In 1985 he plans to try using the plastic clips that close the plastic wrap on bread loaves.

One of the biggest problems in keeping the plastic in place has been wind. A daily 25 mph wind can rip and tear most plastic. MacGregor recalls, "When the wind blows, it acts like a balloon and just pulls off." Any solid sheeting tore whether it was 1 mil, or 3 mils. In 1984, he worked with Dow Chemical's Linktuf™ and had them add rows of ¼-inch diameter holes on a 6-inch center. This stayed on even though it was only ¾ mils thick. "Once we get something that is pretty good, then we can use it year after year."

Israeli Experience

Professor Shimon Lavee, Volcani Center, Israel, visited the U.S. last fall, and at that time he was asked about his work with plastic coverings for grapes. In Israel the polyethelene

MacGregors' crew lay the plastic at 1% bloom.

film is applied right after pruning in order to shorten the period between pruning and bud opening. It is left on until bloom when it is removed to allow wind to circulate for pollination. Their plastic is usually a drape with roof, and two side walls. The roof is left on to protect from hail or rain which can be a problem at that time of year.

MacGregor has been concerned with condensation that forms inside the plastic walls. He has done humidity readings and found, "The absolute values in terms of pounds of water per cubic foot were the same. The relative humidity inside was actually lower. But, I am concerned about the amount of water condensing on the sides of the film." According to Lavee, "We have worked with this from all different angles. I started these studies in 1953. Humidity is not a problem, the condensation is only in the morning and it clears up."

Lavee did express some general cautions. "Temperature control is the biggest drawback. You have to be careful the temperature does not rise above 32°C (90°F). If it does, you inhibit everything you have done. You will then have a negative effect both on maturation and on fruitfulness, particularly on differentiation in the second year."

Lavee also cautions that the plastic material be chosen on the basis of light penetration. "If you don't use the whole system right, light intensity becomes a problem. There is a reduction of light intensity, (I don't know what kind of light intensity MacGregor is dealing with), if the light intensities are low you will have severe problems of bud differentiation for the following year. The moment you put on the polyethelene, you cut that light down." MacGregor has not experienced these problems, but is monitoring this with year to year measurements.

Cost

Not counting the research time, MacGregor estimates that it costs $100/acre to put down and remove the plastic. The plastic cost $2,000 for enough material to cover 20 acres, for an additional $100/acre. To protect against any possible damage from condensation on the film, MacGregor has been applying Benlate/Botran/Captan just before the plastic is laid, starting at about 1% bloom and finishing between 5-10% bloom. This film is left on about 2 ½ weeks. "I really think I need it on for only seven days," says MacGregor, "if they were just the right seven days." The plastic is removed and Benlate/Botran/Captan applied again to be 'super safe', he adds. Whether it is worth the cost depends on the tonnage increase and value of the crop.

Unfortunately, there are yet no hard figures. The 1983 harvest was marred by botrytis, a statewide problem, and the 1984 harvest was affected by a severe frost, (*PW*, January/-February). But MacGregor is continuing the project because he is sure it is giving him results, and he is determined to get the data to prove it. It is his nature to enjoy the challenge of the problem.

"Right now is an exciting time," observes MacGregor. "Growing wine grapes is dynamic, there are going to be changes made in the whole grape growing process. It is going to become much more sophisticated. You are going to have to find out what the parameters are—how hot should the temperature be, when, how long, and what is best. When you do that all of a sudden you can move up and grow very, very excellent grapes and the winemakers can make excellent wines out of them."

AMERICAN WINE SOCIETY 1967

The American Wine Society is a national, non-profit organization devoted to educating its members and the general public about all aspects of wine-production, use and appreciation. The Society is independent and has no commercial affiliation

Membership is open to any interested person; wine enthusiast, professional in the wine business, amateur winemaker — anyone who wants to learn more about wine

Annual (calendar year) dues are $20.00 per individual or couple which includes the Society's quarterly Journal, Special Bulletins and much more

For free brochure write to: AMERICAN WINE SOCIETY, INC.
Dept. PW, 3006 Latta Road, Rochester, N.Y. 14612
(716) 225-7613

Genencor® enzymes

Clearly Better.

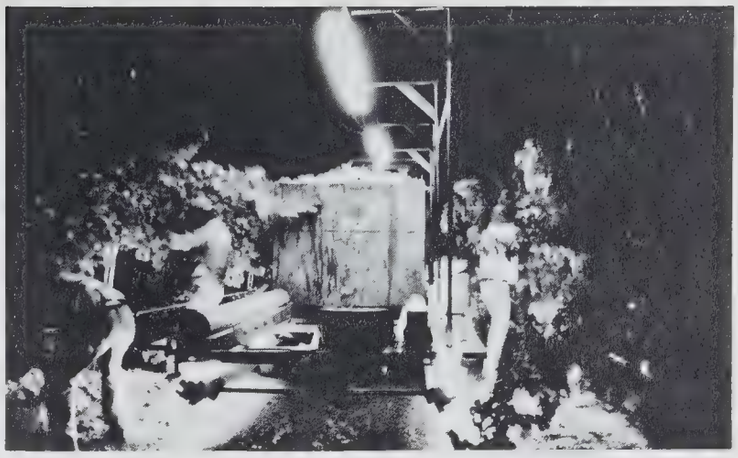
Call us. We'll tell you why.

GENENCOR

Genencor, Inc., 180 Kimball Way, South San Francisco, California 94080, (415) 588-3475

SEE US AT A.S.E.V. BOOTH 76

Night Hand Harvesting



Clark Smith

The entire 1984 harvest of the R.H. Phillips Vineyard in Woodland, CA, was hand-picked at night. To explain why we found this innovation necessary requires a brief discussion of our special processing needs.

In our white wine production, we utilize a drain tank and membrane press which, through selective picking and gentle processing of fruit, provides high yields of juice with 1-3% solids, at low cost. Substituting Bayleton for dusting sulfur eliminates the need for juice clarification. Centrifugation or chill, settle, rack-and-warm, and the resulting wasted energy expense and capital outlay is not necessary.

The key to our system is that 2/3 of the juice is drained through the skins as a filter, yielding completely clear juice. Varieties with relatively tannic skins, such as Chenin Blanc and French Colombard must undergo some skin contact. We stress a light, delicate style, and with our dry Chenin Blanc (which is bone dry), phenolic extraction is a concern. In minimizing harshness and bitterness, we view high fruit temperature and mechanical degradation of the berry as undesirable.

In preparing for the 1984 harvest, we found ourselves confronted with a challenge which traditional harvesting practices could not meet. Mechanical harvesting at night would give cool fruit (60-65°F) but would subject the juice to maceration in a poorly controlled situation, resulting in extended and variable periods of skin contact. Traditional hand harvesting delivers an intact cluster, but requires daylight picking, so that if the crew is to be given an eight-hour shift, fruit may arrive upwards of 90°F.

If these are problems for our own winery, they are doubly troublesome for our grape customers hours away. An elaborate cooling system, such as a must chiller or cooling tunnel, could be expensive for us, and not address the needs of our winery clients.

The solution was to devise a method of night lighting in the picking area to allow manual harvest, with Mother Nature footing the cooling bill. The system had to provide sufficient light to allow cluster selection without rot, and had to be adaptable to ½-ton bins for our own facility and 2-ton 'valley' bins for delivery to North Coast grape buyers.

William C. Fairbanks of UC Riverside investigated this approach for table fruit, and recommended the use of flourescent lights with 80-160 watts per picker, positioned horizontally two feet above the ground so that the canopy doesn't block the light. So placed, the picker cannot block the light, no matter where he stands.

With these ideas in mind, we adapted some self-unloading fruit bin carriers holding six 4 X 4 bins or two 10 X 4 'valley' bins. A portable 1200-watt gasoline-powered generator on the tractor powered six 8-foot two-bulb fixtures, two above the bins for general area lighting and two on either side of the carrier.

A 2-inch by 6-inch step was mounted above the recessed side fixtures to protect them from damage, to give the picker a leg up to dump the lug, and to shield glare when close to the carrier. 80-watt cool white flourescents proved to be low-glare, supplying nearly natural lighting at low cost. (We did not experience insect attraction as a problem.) Five carriers, each accomodating eight pickers, were adapted. Total cost per cart was about $1,500.

Once picked into bins, the mass of fruit holds temperature incredibly well if it is shaded. When our press failed for 24 hours, we were forced to leave 25 tons uncrushed while daytime temperatures topped 100°F. Thanks to selective night picking, fruit deterioration was not noticeable, and the resulting temperature after crushing was 68°F! We feel we recovered our investment many times over from this single incident.

Night picking provides better weather conditions for farm workers, but the midnight to 9 AM shift requires an adjustment for the worker, so it is important to provide steady work.

In developing an entirely new viticultural region as such, we stress production of grapes of the highest possible quality. The condition and temperature of delivered fruit is a quality and cost assessment not to be overlooked.

Announcing the Consulting Team of

R E C T O R & B L A C K B U R N

Designed to get results for the American small winery

Addressing the first issue—Realistic fees, a surprisingly affordable telephone and tasting service. A complementing 39 years of collective, practical experience domestically and abroad.

Call (707) 253-7280 for rates and references.

SAUVIGNON BLANC

With Chardonnay priced beyond the reach of many average incomes, and a near-fanatical interest in creative food-wine combinations, Sauvignon Blanc is enjoying a surge of popularity among consumers and vintners alike. Many winemakers agree that Sauvignon Blanc is a more versatile food wine than Chardonnay; its crisp acidity and fresh, lively flavors complement a range of food from salads and delicate seafoods to grilled chicken and dishes with rich cream sauces. Many wineries have recently added Sauvignon Blanc to their repertoire because of this versatility.

There are at least as many styles of Sauvignon Blanc as there are names for it. Known also as Fume Blanc and Blanc Fume, among others, this wine can be made to exhibit everything from aggressively grassy varietal character to rich oakiness, a 'poor man's Chardonnay'. These differences in style result from a number of winemaking decisions involving grape maturity factors such as pH, acid, and Brix levels at harvest, blending of Semillon, and oak ageing. Vineyard location also influences the wine's style. Sauvignon Blanc grapes grow well in many diverse microclimates.

The range of stylistic preferences exhibited by the various winemakers in the following interviews, and methods used to achieve their particular styles, provide a good demonstration of Sauvignon Blanc's diverse potential in California winemaking.

CRESTON MANOR

PW: What is your style of Sauvignon Blanc?

Vic Roberts: Our wine has a straight-forward Sauvignon Blanc aroma without excessive vegetal tones, but with oak overtones and crisp acidity that is noticeable in the middle palate. At optimum maturity, the components of the wine will be in balance with a complex nose of fresh-cut hay, figs and honeysuckle. The oak will have faded to a hint in the background and it will have a clean finish with the acidity being less noticeable. I expect the wine to peak at 2-3 years past vintage and plateau for 4-5 years longer. I like to see our wine served with seafood in rich sauces.

I like this varietal because of its crisp clean flavor and good fruit retention. When properly managed, it has good varietal distinctiveness which can be complemented with oak. We do blend in 12-15% Semillon, depending on vintage, to soften the 'edges' sometimes found in Sauvignon Blanc.

Proper handling of this varietal includes picking only the cleanest fruit at the proper pH and acid while generally ignoring Brix. This variety has moderately tight clusters which require good vineyard management to avoid bunch rot and botrytis. Temperature control during vinification is important along with use of skin contact and barrel fermentation depending on the fruit characteristics.

What is the source of grapes?

We buy grapes from the Paragon Vineyard in Edna Valley, Rancho Tierra Rejada Vineyard, and French Camp Vineyard in the southeast corner of the Paso Robles appellation. French Camp has provided 33% of the blend; Rancho Tierra Rejada, 33%; and Paragon 20% plus the Semillon. (Rancho Tierra Rejada is described in Martin Bros. interview.)

Paragon Vineyard, at 250-300 foot elevation and six miles from the Pacific Ocean, was planted in 1973 on its own roots with cuttings from Sterling Vineyards in Calistoga, CA. There are 622 vines/acre planted 7 X 10 on clay/loam with calcium rock with a pH of 6.7. The topsoil is 40-42 inches on top of heavy clay with streaks of calcerous material. The vines are cane-pruned on bilateral cordon, on a 3-wire vertical trellis which spreads the fruit and guarantees good air circulation. Pruning is done in February. Further pruning and shoot thinning are done to compensate for a somewhat irregular set. Average yield is 4½ tons/acre.

Ten units of nitrogen are added in February. The annual range of degree days is 2,700-2,800 and the annual rainfall average is 25 inches with a range of 11-50 inches. 3½-4 acre/inches per year of water is applied by drip irrigation. Potential frost damage can occur between March 10 and May 15. Bud break occurs the last week of March. Berry set occurs in the middle of June followed by veraison in the first week of August.

French Camp, at 1,400 foot elevation, was planted in 1972 on its own roots. There are 454 vines/acre planted 8 X 12 in four feet of sandy loam of 7.5 pH on top of decomposed sedimentary rock. They are cane pruned on a bilateral cordon. Pruning is done in January, followed by a nitrogen addition in February to adjust petiole nitrogen. The average yield is 4¾ tons/acre.

The annual range of degree days is 2,950-3,200 with 7-8 inches of annual rainfall. Four sets of overhead sprinklers deliver 16-20 inches/year. Potential frost damage can occur between March 1 and May 20. Budbreak occurs about March 1. Berry set occurs in the last week of May followed by veraison about August 1.

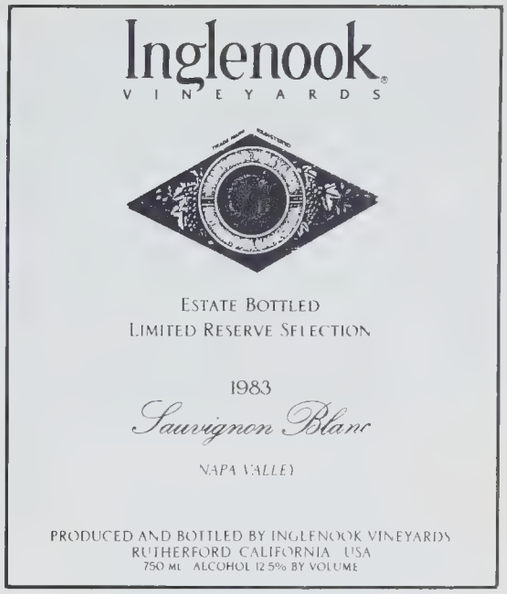
The three vineyards produce the following fruit characters: Paragon, grapefruity, with a citrusy background; crisp, pippin, Granny Smith apple character from French Camp and Ranch Tierra Rejada. Creston Manor has 25 acres planted to this varietal expected to produce 15 tons in 1985.

When are the grapes picked?

pH is the first criteria to determine when to pick. French Camp will be picked between September 1-15 and Paragon will be picked between October 1-15. I have found optimum flavor in these grapes to occur between 3.35-3.4 pH. French Camp and Ranch Tierra Rejada have never produced excessive varietal character when at 21.5° Brix. Paragon fruit will be grassy and herbaceous at 22° Brix and below 21.5° Brix, the varietal character can be overly intense. The Semillon from Shady Valley Vineyards is harvested between September 1-15 at 21-23° Brix with a TA between 0.75-0.90 and a pH of 3.35-3.50. In 1984, 1/5 of the lot came from estate vines in third leaf at 21.8° Brix, 0.77 TA and 3.15 pH.

Vic Roberts

John Richburg



How is the wine made?

Hand-picked grapes receive 30 ppm SO_2 at crush. Rice hulls are added at 2% by volume as a press aid. The juice is settled at 40°F for 24-72 hours before racking and inoculation. Fermentation at 50-55° lasts 7-10 days. First racking off the yeast lees occurs 7-10 days past dryness. The wine is racked again in two weeks and when transferred to barrels. During barrel ageing, barrels are topped every 2-4 weeks.

The lots are in a mixture of new, 1 and 2 year-old American oak and Limousin oak barrels between 1-4 months. Our heat stability test is 48 hours at 140°F followed by 24 hours at 40°F and inspection. Bentonite requirements average five lbs/1,000gal. The free SO_2 is adjusted to 35 ppm prior to barreling and again to 35 ppm prior to filtration at bottling.

The Semillon generally sees little or no skin contact and is fermented and stored in stainless steel until final blending for bottling.

INGLENOOK VINEYARDS

PW: What is your style of Sauvignon Blanc?

John Richburg: Our style is crisp with lots of fruit, taking advantage of the grape's potential. The wine has a balance of alcohol, acid, pH and sugar. Upon release, the wine is crisp on the palate with a medium body. At maturity, the wine will be soft, crisp and all elements will have mellowed together. I believe the wine has three years of cellaring potential. I would recommend oysters on the half-shell with lemon, gazpacho, grilled chicken breast with olives or salsa-verde to accompany our wine.

The best characteristics of this varietal are its fresh, distinct, and flavorful qualities. The varietal character can be affected by picking at different Brix. We blended 18% Semillon into our 1983 vintage to add body.

What is the source of the grapes?

Inglenook has 25 acres planted to this varietal and we buy grapes from seven other valley floor vineyards between Yountville and Calistoga. These vineyards were planted between 4-17 years ago, many on AXR-1 rootstock. Cordon training is common and crop size is controlled by pruning and thinning to an average yield of 3 tons/acre. These vineyards are rated Region II and III and receive between 35-55 inches/year of rainfall. Most vineyards usually receive 2 irrigation applications, either by drip or sprinkler. Potential frost damage can occur in April and May. Bud break is in mid-March followed by berry set in May. Potential problems with this variety include ripening too fast, mold and mildew.

When are the grapes picked?

Sauvignon Blanc is picked in September. We determine when to pick by taste, appearance and analysis.

How is the wine made?

Hand-picked grapes receive 75 ppm SO_2 and 100 mls/ton pectic enzyme at crush. Acid additions with tartaric have been made depending upon both TA and pH. Free run and press juice are settled 24-48 hours at 40°F before racking and inoculation. Fermentation takes 20-25 days at 55°F +/-1°. First racking off the yeast lees occurs when the wine has reached 3-5° Brix. Further rackings are done at two and four weeks.

Barrel ageing in one-year-old French oak barrels averages three months and barrels are topped monthly. After barrel ageing, the wine receives a heat stability test of 48 hours at 130°F followed by inspection. The wine receives SO_2 adjustments prior to and after barrel ageing. Cold stabilization is done after barrel ageing followed by a DE filtration prior to bottling.

The blending grape, Semillon, comes from Yountville and is harvested in September at about 22.0° Brix, 0.70 TA and 3.4 pH. The wine at bottling has 35/120 ppm free/total SO_2 and is bottle aged a minimum of three months before release.

MARTIN BROTHERS

PW: What is your style of Sauvignon Blanc?

Nick Martin: Our wine is fresh, fruity, low-alcohol, slightly tart, with subdued to mild-grassiness, with an emerging complexity. It is a crisp wine, varietal to a point beyond mere austerity. I like the distinctiveness of this varietal. At maturity, the wine will have subdued to slight-grassiness with a suggestion of oak, and be not overtly tart. Cellaring potential is 2-4 years. I recommend this wine to go with salads, light lunches and hard cheeses.

The varietal character in Sauvignon Blanc from a very cool year can be affected by fermenting more in barrels or hotter

Nick Martin

Bob Mueller

in tanks to blow off some of the cool climate bubble-gum fruitiness.

What is the source of the grapes?

We have 15 acres planted, but not yet in production, including three acres of Semillon which should produce in 1986. Meanwhile, we are buying fruit from Rancho Tierra Rejada which is nine miles east of Paso Robles at 800 feet elevation. Heat-treated Merlot and Zinfandel cuttings from Montevina were planted in 1973 on 7 X 12 spacing, equalling 518 vines/-acre. These vines were T-budded to Sauvignon Blanc and are cane-pruned to a 3-wire trellis with the bottom wire at 40-inches. Vines are pruned in December and January to 4 canes with 15 buds and 4 renewal spurs, which yield 6½ tons/acre.

The soil is sandy loam to clay loam with a pH of 7.5 and a topsoil depth of 60-72 inches. A fertilizer application of UN32 is applied through overhead sprinklers four weeks before budbreak in February. Average range of degree days is 2,700-3,200 with 12 inches of average annual rainfall. Overhead sprinkler irrigation is scheduled based on hand-augering tests, depending on block. Potential frost damage could occur between March 15 and May 1. Bud break comes between March 15-21 and berry set in the first week of June. Veraison follows in the third week of July.

In our own vineyard we are conducting an experiment with 6 acres cordon-pruned and nine acres cane-pruned to analyze the pruning cost, tractor cost, sunburn damage and rot. We expect four tons/acre from 565 vines/acre on 7 X 11 spacing. We are using drip irrigation. We have unstable sandy loam soil and have undertaken a cover crop experiment on half the ranch. After adding 250 lbs/acre of ammonium phosphate fertilizer, we are comparing 6 lbs/acre of blando brome with 3 lbs/acre of zorro fescue on slopes of less than 9%. We mowed the cover three times in 1984 which is easier on the tractor than roto-tilling and maybe twice as fast.

When are the grapes picked?

Grapes are picked in the first or second week of September based on the flavor, pH and TA, and ° Brix of the grapes. Paso Robles Sauvignon Blanc can be picked at low sugars with good character and no green flavors. In 1984, one third of the grapes came from the estate. The 1985 vintage will be entirely estate grapes.

How is the wine made?

Hand-picked grapes receive 0-50 ppm SO_2 at crush. In 1984 I added no SO_2 to estate grapes to let the juice brown and unstable phenols fall out. Purchased grapes received 30 ppm. I began adding 10ml/ton pectic enzyme in 1983 which has improved pressability and yields. In 1984 for the first time, we fined the juice with 4 lbs/1,000gal of bentonite, which does improve total yields to the bottle.

After juice has been settled for 36 hours at 45°F and racked, a tartaric acid addition would be made to shift the pH to 3.3 or below. Yeast nutrient of 2 lbs/1,000gal was added after juice racking. In 1982 and '83, the juice was fermented in stainless steel at 55-58°F until 10° Brix and then transferred to 2,000 gal French oak uprights to complete fermentation. I have noticed a tendency for this wine to pink if the juice is not significantly oxidized prior to fermentation.

First racking off the yeast lees is done two weeks after dryness, followed by 2 or 3 more rackings at monthly intervals. Barrel ageing in Limousin barrels takes 1-4 months depending on age of the oak and the barrels are topped every 2-3 weeks. Our heat stability test is 24 hours at 140°F followed by refrigeration, warming to room temperature and inspection. 5.5 lbs and 5.0 lbs/1,000 gal bentonite were required in 1982 and '83. The 1984 estate lot received its first SO_2 addition after fermentation. SO_2 adjustments are made to keep the free level greater than 25 ppm.

The wine receives 30 days of tartrate precipitation at 32-36°F. Two filtrations one week before bottling are a coarse and tight pad combination in a cross-over plate-and-frame followed by a tight and sterile pad combination. There is a 0.45*u* cartridge at bottling and the wine is bottled with 30-35 ppm free SO_2 and held 2-3 months before release.

ROBERT MONDAVI WINERY

PW: What is your style of Sauvignon Blanc?

Bob Mueller: Sauvignon Blanc is very versatile in accompanying any food occasion, certainly most any fish or fowl—a very strong value for the dollar. We make the wine in a Fume Blanc style which is round, with adequate varietal character, fresh, and straight-forward. It has a balance of acid, alcohol, sugar, phenols, age and grape maturity.

Upon release, the wine is full, rich, crisp and varietal and is well-balanced and complex at maturity. The wine has a cellaring potential of 5-10 years. We blend in Semillon to add softness, roundness, complexity, and to take the 'edge' off the grassy, vegetal Sauvignon Blanc character.

There are many techniques that can affect the style of this wine (as it can be overly varietal) including: soil, meso-climate, trellising/fruit exposure, picking at maturity, ageing in oak and many more.

What is the source of the grapes?

We purchase 30-40% of the grapes for this wine from vineyards located between Oakville and Napa and in Wooden Valley. These vineyards with their diversity in location, soil, management, etc., help us achieve our wine style each vintage. Most vines have been planted 8-15 years, generally on 8 X

12 spacing, and on AXR1 rootstock. Vines are head-trained and cane-pruned on a 2-wire vertical and T-type crossarm. Pruning to 2-4 canes and 12-14 buds each is done in late January and February to yield 4-6 tons/acre. This pruning practice which has served well, is currently under evaluation.

Most vineyards have a well-drained clay/loam soil of 6.5 pH ranging in depth from 18 inches to over 10 feet. Fertilization is determined by soil and petiole analysis as well as wine and vine evaluation. The vineyards are rated high region II to low region III. Annual rainfall average is estimated at 30 inches. Some vineyards are non-irrigated while others are and the amount of application depends on the vine's needs and use of tensiometers, gypsum blocks, visual evaluation and previous vintage history.

Potential frost damage could occur from bud break in mid-late March to early June. Berry set occurs in very late May/early June followed by veraison in early August. These vines tend to form dense canopy which must be managed and they are difficult to machine-harvest.

When are the grapes picked?

Sauvignon Blanc is generally hand-picked in the first two weeks of September. Factors affecting the picking decision include: Brix, TA, pH, fruit and vine condition.

How is the wine made?

After skin-contact and pressing, 30 ppm SO_2 is added to the juice. Occasional acid additions have been made to adjust the TA to 0.7-0.75 with the following additions: if the juice pH is greater than 3.5, use all tartaric; if juice pH is under 3.5, use half/half malic and tartaric. The juice is settled approximately 24 hours before racking and inoculation. Juice lees go through a decanter centrifuge.

The wine is first racked 1-3 weeks after the 2-3 week fermentation. Malolactic fermentation is not part of production at this time, but we are conducting experiments. The wine sees French oak barrels from 2-8 years-old for 6-8 months, and the barrels are topped at four months.

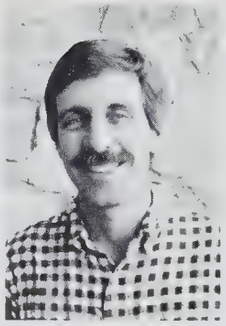
Our heat/cold stability test is 100°F and 140°F. Average bentonite requirements have been 3-5 lbs/1,000gal. The wine receives an SO_2 adjustment to 25-28 ppm free at barrel topping. We have fined the wine just prior to bottling with various fining agents in the range of ¼ lb/1,000gal including casein, gelatin, or isinglass. A tight pad filtration is done at bottling and there is an 0.45*u* membrane cartridge on the bottling line. The Semillon is picked in early September between 20-23° Brix, and about 0.6 TA and 3.4 pH. The blend is made after barrel ageing. The wine is bottled with 28-33 ppm free SO_2 and the wine is held 16 months before release.

SILVERADO VINEYARDS

PW: What is your style of Sauvignon Blanc?

John Stuart: Our Sauvignon Blanc is distinguishable, with racy aromas and flavor, which make it a refreshing alternative to Chardonnay. Our style is balanced, with harmonious flavors and no single element dominating. Upon release the wine is aromatic, floral, with a distinctly varietal aroma and a hint of pineapple fruit. The wine has medium body and finish and is crisp on the palate. At maturity, the wine has developed deeper, more complex, richer tones in aroma. The flavors are more expansive, smoother, with a longer finish. The complexities of wood ageing come forward. Ageing potential is 1-3 years.

Our wine has sufficient acid and low pH, limited oak ageing, relatively low sugar at harvest, minimal skin contact and cool—not cold—fermentation. Picking too early or too late can diminish varietal character. Our harvest window of 21-22° Brix, 0.8-1.0 TA and 3.15-3.35 pH seems to bring out the best character. Skin contact emphasizes the coarser varietal character, while warm, barrel fermentation de-emphasizes the varietal character.



John Stuart

What is the source of the grapes?

We have 24 acres one miles east of Yountville along the Napa River. Half was planted in 1979, half in 1984. 566 vines/acre are planted 7 X 11 on AXR1 rootstock in yolo loam and cole silt loam with a depth of up to 4 feet. Vines are bilateral cordon trained and spur-pruned to a single wire or 3-wire with cross-arm. Pruning to 3-bud spurs with 14-16 buds is done in December and January. Average yield is 5.3 tons/acre. Controlling vigorous vegetative growth and balancing the crop level to leaf area is a constant goal.

Average range of degree days is 2,990. Rainfall was 24 inches in 1980-81 and 60 inches in 1982-83. Young vines receive overhead sprinkler irrigation as needed and mature vines receive no irrigation. Potential frost damage could occur in April and May. Bud break is mid-March to first week of April. Bloom is mid-May to first week of June and veraison follows in mid to late-August.

When are the grapes picked?

Grapes have been hand-picked between August 27-September 28. The weather, condition of vineyard, soundness of fruit and our harvest window help decide when to pick.

How is the wine made?

25-35 ppm SO_2 is added to the juice after pressing. Tartaric acid additions have been made before fermentation to shift pH to the desired range. Juice is settled 24-48 hours at 45°F before racking and inoculation. Juice lees usually go through a lees filter and the recovered juice is returned to the fermenter. Fermentation of 2-4 weeks begins at 55°F and a rate of 1° Brix drop/day is controlled through the vigorous part of fermentation. The fermentation is allowed to warm to 60-65°F to complete.

The wine is racked off the gross lees at dryness, and racked off the secondary lees at 2-4 months followed by one more racking when the wine has clarified in the barrel or tank and is ready for blending. The wine sees 2-3 months in new and used French oak barrels or 0-4 months in 50hl French oak tanks. Barrels are topped monthly.

Our heat stability test is to incubate the filtered control and treated samples at 37°C and 60°C for 24 hours and examine for haze. Depending on pH, the free SO_2 is adjusted to 20-30 ppm after the wine clarifies from opaque to translucent or slightly hazey, and is maintained above 20 ppm free.

After the final blend is made, the wine is chilled to 30-32°F with daily circulation until cold stability is achieved, usually 10-15 days. After tartrate precipitation and bentonite fining, the wine receives a double filtration of DE followed by tight

pads in a plate-and-frame. There is a 0.8*u* prefilter and 0.45*u* membrane cartridge in-line at bottling. At bottling, the wine has 25-30 ppm free SO_2 and a total of 80-100 ppm. The wine is held 4-6 months before release.

Zelma Long

SIMI WINERY

PW: What is your style of Sauvignon Blanc?

Zelma Long: This varietal's best characteristics are its freshness and attenuated varietal character. Our goal is to achieve a delicacy and crispness in the mouth with an understated pear/hay quality in the nose. We want a freshness and bottle longevity without the wine becoming heavy with age. Semillon is blended to add softness to the wine. When the wine is released six months after bottling, the varietal character has become pronounced. Optimum maturity should be 6 months to two years after bottling and it will plateau for up to 4 years. I like the wine with simple delicate seafood, or dishes with tomato and/or tomato sauce, and mesquite-grilled chicken or fish.

What is the source of the grapes?

We buy Sauvignon Blanc grapes from four vineyards located in the Chalk Hill region and other parts of the southeast area of Alexander Valley. Our blend is 40% from a deep, sandy soil vineyard; 5% from a deep, gravelly soil vineyard; 5% from a shallow volcanic pumice vineyard; and 50% from a vineyard with shallow rocky soil which modulates to deep fertile soil. Vineyards range in elevation from 15-1,000 feet and were planted between 5-10 years ago.

General planting is 8 X 12 on AXR1 rootstock. Training and trellising varies from 2-wire vertical; to crossarm with 2-wire vertical; to high head, cane-pruning to produce an average of five tons/acre. Irrigation systems include overhead sprinklers, or drip, or subsoil drip. Bud break occurs in April-May followed by bloom in June and veraison follows about July 15.

When are the grapes picked?

The hand-picked grapes came in between September 28-October 5 in 1982, and September 19-October 7 in 1983. The condition of the vines and grapes, and color, texture, aroma, flavor and °Brix of the grapes dictate when to pick.

How is the wine made?

No SO_2 is added at crush and acid adjustments have been made with tartaric to achieve 0.8 TA or 3.25 pH, whichever comes first. Skin contact time at 60°F averaged 18 hours in 1982 and 11 hours in 1983. The juice receives 2-5 lbs/1,000 gal bentonite fining. The juice is settled at 8-9°C for an average of 24 hours or until clear (0.25% solids) and then racked and inoculated. Juices lees are filtered and the filtered juice is returned to the fermenter.

The average 10-14 day fermentation begins with the juice being warmed to 17-20°C for inoculation and then dropped to 13°C when the yeast count is satisfactory. Close to the end of fermentation, the wine is allowed to warm back up to 17-20°C. First racking off the yeast lees will occur between 1-12 weeks after fermentation when the wine is moved to barrels. The used French oak barrels are usually not topped during the 3-4 month barrel ageing.

Our juice heat stability test consisits of treating samples with bentotest and observation, requiring an average of 4-5 lbs/1,000 gal total. After fermentation, an SO_2 addition of 30 mg/l-35 ppm free is made. The SO_2 is maintained above 25 ppm in tanks and above 20 ppm in barrels. Tartrate precipitation is usually not necessary. We have fined the wine with various fining agents: 2 lb PVPP and ⅛ lb casein/1,000 gal in 1982 and ½ lb/1,000 gal of egg white in 1983.

Semillon from deep heavy loam soil is picked in late September and early October at 19-20° Brix for blending and is not barrel aged. The final blend is made two months before bottling. A tight and sterile pad filtration is done just before bottling and there is a 0.45*u* membrane on the bottling line. The wine has 28-35 ppm free SO_2, depending on pH, and is held six months before release.

GRAPE INTELLIGENCE
Summary of California Grape Statistics and Projections 1976-1990

20 Varieties - 9 Regions

Subtotals and Combinations

Including Acreage, Production, Prices, Yield Per Acre, Variations from Normal, Written and Graphic Analyses

WINE INTELLIGENCE
Quarterly California Wine Industry Shipment Report

Industry Summary
25 Individual Companies

5-Company Subgroup by Region and Size

Comparative Data: 1980 - Current

Send for Free Excerpt and Subscription Information

GEORGE M. SCHOFIELD COMPANY • P. O. BOX 539, ST. HELENA, CA 94574

SAUVIGNON BLANC WINEMAKING SUMMARY
MAY-JUNE 1985

WINERY	HARVEST CRITERIA	SKIN CONTACT HRS + TEMP.	JUICE TREATMENTS	YEAST/PEAK FERMENTATION TEMPERATURE (juice)	ACID ADJUSTMENT	BENTONITE FINING LEVELS	COOPERAGE	FILTRATION
Creston Manor *Vic Roberts*	21-22.5° Brix 0.7-0.85 TA 3.2-3.35 pH	0-24 hrs 40-45° F	none	2% freeze-dried Montrachet 50-55° F	tartaric to shift pH to 3.15-3.25	4-6 lbs/ 1,000 gal	1/3 Limousin 1/3 Am. oak 1-4 months	0.45 *u* cartridge at bottling
Inglenook Vineyards *John Richburg*	21-22° Brix + 0.70 TA + 3.3 pH	0-12 hrs 45-50° F	pectic enzyme	1% Champagne 55° F	tartaric	3 lbs/ 1,000 gal	1-year-old French oak barrels 3 months	DE + 0.45*u* cartridge at bottling
Martin Bros. *Nick Martin*	20.5-21.5° Brix 0.85-0.90 TA 3.25-3.35 pH	1/2 of lot overnight 45° F	10ml enzyme + 4 lb/1,000 gal bentonite	2.0% freeze-dried Champagne 60-65° F	tartaric to shift pH to 3.3/below total, ind. juice treatments	5-5.5 lbs/ 1,000 gal	3-year-old Limousin 1-4 months	coarse/tight pads tight/sterile pads + .45*u* at bottling
R. Mondavi Winery *Bob Mueller*	22-23° Brix .75-.95 TA 3.4 pH	1-4 hrs 60° F	none	3-5% liquid culture Prise de Mousse 60-68° F	adjust to .70-.75 g/l	5 lbs/ 1,000 gal	French oak barrels 6-8 months	tight pads + .45*u*
Silverado Vineyards *John Stuart*	21-22° Brix 0.8-1.0 TA 3.15-3.35pH	0-4 hrs 55° F	none	2% liquid culture Pasteur White 55° F	tartaric to shift pH to desired range	1-3 lbs/ 1,000 gal	French oak barrels 2-3 mos or 50 hl French oak tanks 0-4 mos	DE + tight pads 0.45*u* at bottling
Simi Winery *Zelma Long*	20.5-22° Brix, good aroma, flavors, balance	0-10 hours 60° F avg	2-5 lbs/ 1,000 gal bentonite	2% Prise de Mousse to juice at 60-68° F	tartaric to shift to 3.25 pH or 0.80 TA	only if needed after juice fining	2/3 in French oak barrels 3-4 months, 1/3 stainless only	tight + sterile pads + 0.45*u* at bottling

TASTING NOTES

Scott Clemens, *PRACTICAL WINERY*
Doug Nalle
Don Neel, *PRACTICAL WINERY*
Dave Ramey, *Matanzas Creek Winery*
Jack Stuart, *Silverado Vineyards*

Harolyn Thompson, *Writer, Artist*
Bob Thompson, *Writer, Editor*

Thanks to Silverado Vineyards, Napa, CA for hosting the tasting.

1982 Robert Mondavi Fume Blanc, Napa Valley

Comments before the unveiling:

B. Thompson: I think this one used oak substantially to temper the Sauvignon Blanc character. It still had a very good varietal character, that oily/grassy side of Sauvignon Blanc—not a dry grass, a distinctly green, wet grass. (I know, I've tasted those grasses. Spring grasses don't taste really grassy; they have a lushness about them.) I thought the oak outweighed the fruit a little bit, but because it finished with fruit I felt it was more positive than negative.

Ramey: Nice lemon green color. I didn't pick up the oak. I got a kind of Sauvignon Blanc character (that I like) which I characterize as bell pepper rather than grassy/herbaceous. That's the appealing Sauvignon Blanc characteristic; it's a richer, fuller, more aromatic style of Sauvignon Blanc, but in the mouth the acid was low. It was full flavored and rough with some astringency, so I see it as a skin contact wine, or one with slightly riper grapes—full, broad, slightly too coarse—but I think the grape character was good. Perhaps the handling of the grapes was a little too heavy, too much skin contact, possibly too long in barrels. I think you make a more delicate wine with oxidized must and then protecting the wine. Maybe they protected the must, and then weren't quite so careful with the wine—there are a lot of possibilities.

Neel: Do you think the grapes were overripe?

Ramey: Not overripe, but on that end of an acceptable range.

H. Thompson: I divide Sauvignon Blancs into the floral ones and the grassy ones, and I found this to be the most floral of the group. It wasn't too acid for my mouth; it had good complexity, but a tad hot in the finish.

Stuart: I found this less oaky than other wines in the flight. I got a slight oakiness in the aroma, and I got the astringency that David mentioned. (I don't know if that's simply because it's newly bottled or it really is a coarse wine.) I liked the Sauvignon Blanc character of this wine best of the wines in this flight. I like Bob's description of "oily Sauvignon Blanc"; it makes me think of olive oil. Grassy is not a good descriptor; everybody knows what grassy means, but grassy doesn't describe it. There aren't really too many wines that smell like grass does, but I agree that it's floral. Overall I thought of it as a controlled, soft-spoken wine (if you don't count the coarseness) and it also seemed as if it might have been blended to a standard. It seemed less idiosyncratic than some of the other wines; it seemed there was a stylistic goal here and the wine was made to a particular goal.

Nalle: I thought it was wonderful wine. It has an advantage over the others in that it appeared to be the oldest of the bunch, and it was gracefully old. It had the pineapple/hard candy character which is that oxidation and aged-Riesling character, and also that olive and bell pepper. The second time I came back to it I flashed on an incense shop from about 1970 (or maybe a tobacco shop); it had that spicy incense smell. I understand the comments about harshness, and it is a bit heavy handed, but it is the most complex in this flight.

Neel: Is a geographical location apparent with this wine?

B. Thompson: I generally think that oily/grassy part of it comes from Napa, but I've gotten past believing in myself in those kinds of things.

Comments after the unveiling:

Nalle: People talk about how they've backed off, but that's not backing off much.

Ramey: We had this in a tasting about four months ago, and I'd say that it has changed a lot in the bottle and that it's ageing rapidly. I thought it was much more delicate the first time I had it.

Clemens: I thought this was much more austere than previous vintages.

Nalle: But since everyone is making it more austere, they still haven't caught the mainstream. It is lighter, but I think Dave's comments are valid; it does appear to be more of a skin contact wine than the other wines. It's a little bit harsh, but the complexity in this wine is hard to beat. It justifies, perhaps, a higher price. Some Sauvignon Blancs you taste could be done just as well with Chenin Blanc, and that makes Sauvignon Blanc an overpriced wine.

Neel: Skin contact is becoming less of an issue at Mondavi.

Ramey: Maybe less of a practice, but not less of an issue.

1983 Creston Manor, San Luis Obispo

Comments before the unveiling:

H. Thompson: I thought this was more grassy and the oak was more pronounced than the Mondavi. It was young, balanced, slightly tart, not overwhelmingly Sauvignon Blanc.

Nalle: I have a bias here. I thought there was some American oak coming out that was a little aggressive for my taste. There was a little (burlap) cooperage mustiness here that I might overlook at the table.

Stuart: This was one of the two wines I thought was very oaky, slightly toasty, either barrel fermented or aged a long time in the barrel. I got a cloying sweet oak character to an excessive degree, but I thought it was Limousin rather than American. When you can recognize it as oak, it's too much. Also, I think I picked up a threshold H_2S. That is not necessarily bad, especially in Sauvignon Blanc where it's difficult to distinguish between a certain kind of Sauvignon Blanc varietal character and a low level of mercaptan or some other sulfide compound. The other thing is that it was surprisingly tart and lean in the flavors for the aromas; the aromas made me expect a fuller, heavier, more viscous wine in the mouth.

B. Thompson: This was one of the enigmas of the group for me; I found myself changing my mind about it. My first impression was that it was one of the most floral noses, and maybe that was the oak you were talking about. I came away thinking that was a pretty adroit use of wood because I found it a little hard to separate from the other things that were going on in there. If not exactly everybody's choice of how to use the wood, it was still a good wood to choose because it married with the varietal flavors.

Ramey: This was my second favorite wine. Maybe because we work with higher levels of oak across the board, I'm not as sensitive to oak, but I didn't get a lot of oak. To me this seemed Semillon-like, definitely figgy and pear-like, and in addition I got an autolysate note. Maybe the combination of the figs and the yeastiness was what you perceived as musty. In any case it was non-grassy, but nice. I prefer a little more grassy character but it was a good style, not too alcoholic, not too strongly oaked. I liked it even in the absence of pronounced Sauvignon Blanc character because of what I considered excellent delicacy and prominent, but not overdone, acidity. Overall, a nicely styled wine in a Semillon sort of way.

Nalle: My experience with Semillon is that it isn't this kind of wine.

Stuart: I've never made Semillon, so I don't know, but I think Dave is correct in pointing out the autolysate character, but I still smell a vanillin straight wood extract in there that I don't find unpleasant. It does come off as a woody and lees aged wine.

Comments after the unveiling:

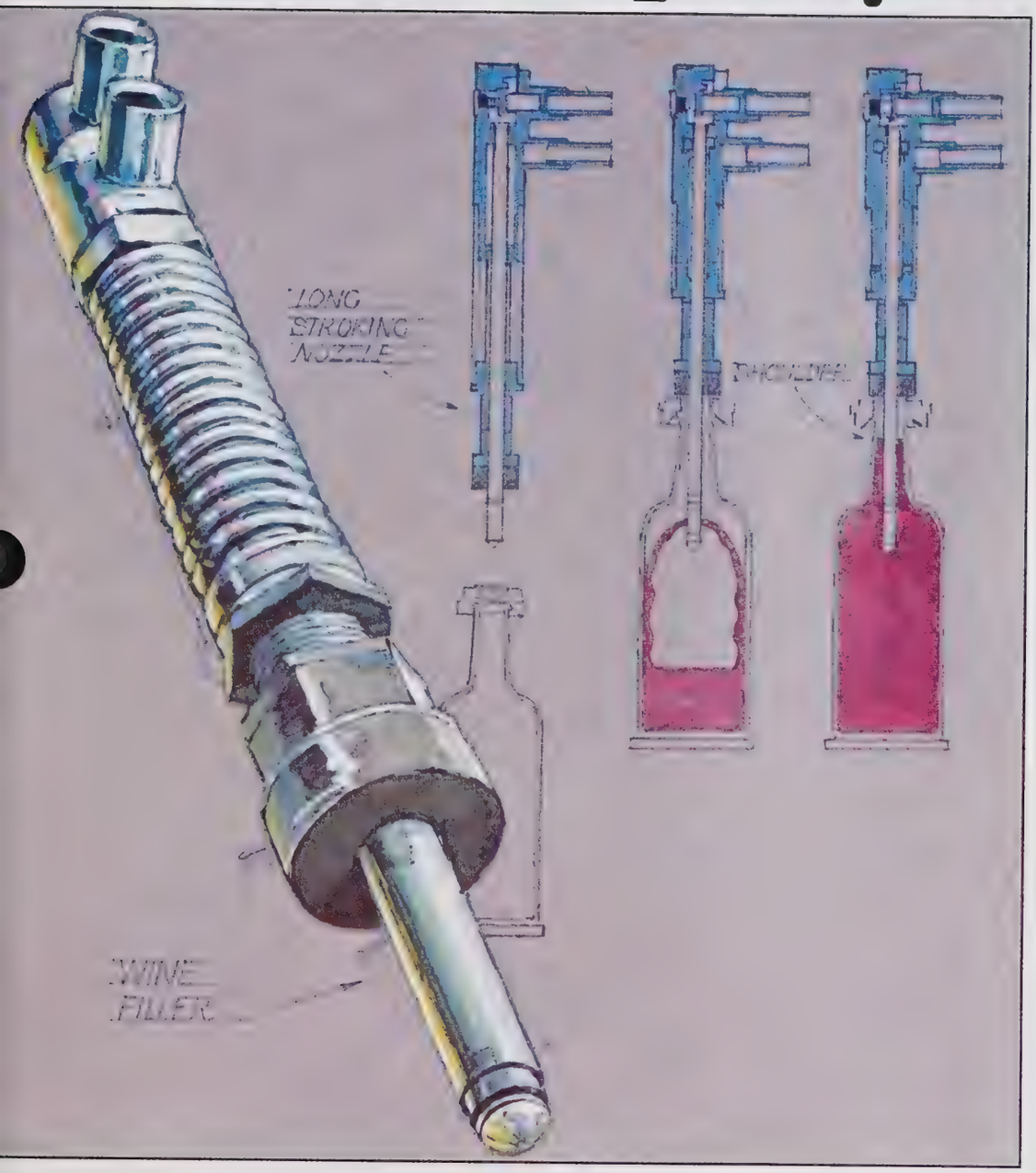
Clemens: Do you have a feeling as to whether Sauvignon Blanc picks up oak faster, or at the same rate, as Chardonnay?

Ramey: I think less fast because of the lower alcohol.

Stuart: And the varietal character, being more intense in Sauvignon Blanc, tends to mask the oak.

Nalle: We made some Sauvignon Blancs that were 13 alcohol, and I thought they were too oaky; they'd be all right, and all of a sudden they'd turn the corner.

The fast and fine-handed wine filler from Pneumatic Scale. It preserves quality at high speed.



Some of the world's largest wineries use our bottling machinery and the reasons are design features which insure high speed filling (up to 21,600 bottles per hour) along with meticulously gentle handling of the wine. The key feature in our wine filler is the patented long stroking nozzle which permits "below the shoulder" filling techniques. Our nozzle directs the product down the sides of the bottle to insure gentle wine flow while keeping aeration and oxygen absorption at an absolute minimum. You can put wines into the most exotically shaped bottles from 180ml to 4 liters always achieving precise level control with tolerances less than plus or minus 1.58mm. Since our filling pressure is lower than regular counter pressure machines, you can fill hot, cold, and even semi-carbonated wines at high production levels. Our standard flow through system also features automatic machine clean-in-place sterilization.

Write or call for information now. Pneumatic Scale Corporation, 65 Newport Avenue, Quincy, MA 02171, (617) 328-6100. In Canada, write Delamere & Williams, 21-35 Carson Street, Toronto, Canada.

pneumatic scale
packaging and bottling machinery
CORPORATION

SEE US AT A.S.E.V. BOOTHS 123-124

B. Thompson: Chardonnay seems to adapt itself to all sorts of oak, coopers, regions, and the oak and fruit flavors mate easily. I think Sauvignon Blanc must be harder to do that with because the flavors are more pronounced and specific, and the oak sometimes tends to stand away as a separate item. Do you find oak harder to choose for Sauvignon Blanc?

Stuart: I'm trying to make racy, crisp, varietal Sauvignon Blancs and a sweet, cloying style of oak is not appropriate, so we use different types of barrels for the Sauvignon Blanc and Chardonnay. Also the Chardonnay sees more new oak from Burgundy, whereas the Sauvignon Blanc generally sees used barrels from Bordeaux.

Ramey: Once you've decided on what you like it's easy. We favor once-used Taransaud oak.

Nalle: Then there's a group that feels very strongly that American oak is the way to go.

Ramey: There is a sweet/grassy/dill component in American oak that compliments the grassy Sauvignon Blanc character.

Clemens: You think the dill character comes from American oak?

Stuart: I think that American oak has a dill component to it.

Clemens: I've picked it up in a lot of Chardonnays that were aged in French oak.

1983 Martin Brothers, Paso Robles

B. Thompson: It started out as ringingly clear Sauvignon Blanc. Then there was something in the background that fattened it up and rounded it off and I thought it might be just a touch of Semillon. One of the most impressive things about this was a very long finish that was perfectly true to the nose. This was definitively Sauvignon Blanc and at the same time not aggressive about it.

Clemens: It had that nice floral/marjoram character in the nose.

H. Thompson: I found a peachy note in the nose. It was more herbaceous in the mouth than in the nose. Good acid, nice tart finish. I thought it was a classic example of a good Sauvignon Blanc.

Nalle: It's nice to find a wine with acidity that tastes like it was there from the beginning and didn't come out of a bag. Very married acidity. If they acidulated it they did a nice job of it. This is the seafood wine of the group, but not just simple. It was more of a French style of wine. I got some sulfide in the nose at the beginning, but it went away.

Stuart: I got a threshold mercaptan in the nose and it doesn't seem offensive. I liked the sweet grassy aroma, similar to but more intense than the Mondavi. I thought that the acid was too high in that it seemed tart to the point of being astringent and masking the fruit a little bit, but it may be that this is a very young wine and that may smooth out with time. But I like this crisp, grassy style.

Ramey: The nose was nice and grassy but it had a touch of that cat-piss character (there's no other word for it).

Clemens: Civit.

Ramey: In any Sauvignon Blanc tasting you'll find one with this character. I think that's varietal, but I don't like that character. I think the acid is too high. There's a hard quality here that I think is a combination of acidity and as yet unoxidized phenols.

Nalle: You might call it eucalyptus, but that's being kind. If you crush a eucalyptus leaf you get the urine smell of a Tom cat.

Clemens: I grew up in a eucalyptus grove and I don't get that smell out of eucalyptus leaves, but then we all have different thresholds.

Ramey: It's a real problem viticulturally, because if you have this character there doesn't seem to be any way to get rid of it.

B. Thompson: Is there any common thread between the vineyards that have it?

Ramey: I don't know; I haven't studied it.

Nalle: We had it at Balverne and it would come and go. We'd bottle it when it wasn't there, and it would come back. Now it's fading.

Clemens: In Cabernet the eucalyptus character can be traced to eucalyptus trees bordering the vineyard.

Nalle: That's impossible in this case. The Grgich, William Wheeler, Domaine Laurier—a number of wineries have had the problem.

Neel: Do you think the wine was acidulated?

Ramey: I have no idea.

CORK and SEAL
of CALIFORNIA, INC.

SPECIALIZING IN

Polylaminated or
Aluminum Capsules
Wire Hoods
Corks
Tin Lead Capsules

OTHER PRODUCTS

Special Capsules for
Magnum and Oversized Bottles
Still Wine Corks
Still Wine Pre Heat Shrink Capsules
Still Wine Tin Lead Capsules

CSC

5415 NAPA VALLEJO HIGHWAY•VALLEJO, CA 94589
707 257-6481, 82 • TELEX 176 924 COSECA VLLJ.

TEMPERATURES
TO 600° C.
THE HEAT
YOU NEED

LEISTER BLOWER & HEAT SOURCES

Clean, safe, reliable for continuous industrial use.

110 Volt, 220 Volt or 440 Volt up to 10,000 Watts
Heat, shrink, bend, solder, de-solder, weld thermoplastics.
activate adhesives, distill, dry, sterilize.

Adjustable Temperatures to 600° C.

LEISTER GHIBLI

PVC pipe, repair cracks, make your own fittings, repair storage tanks, pond liners, bale covers, tarps, conveyer belts, feed bins, vehicle parts, weld, shrink, heat, dry, sterilize

CALL OR WRITE FOR BROCHURE NO. 20 38

BW brian r. white co., inc.

313 henry station road
ukiah, ca 95482-9990
(707) 462-9795

one industrial way w., bldg. e
eatontown, nj 07724-9998
(201) 544-1212

LEISTER

Stuart: It's hard to say. You can speculate if you know something of the vintage.

1983 Creston Manor, San Luis Obispo

Comments before the unveiling:

Stuart: Flawed, not because of winemaking flaws but because it is not varietal in character. It has a closed, wet concrete or gypsum aroma. It has no fruit. It's flat and coarse. It's like you licked a concrete floor. It's a very odd, tanky, earthy flavor and smell.

Nalle: I called it British Ale. That's oxidation, and not graceful oxidation.

Stuart: It doesn't have an oxidized color; I don't get any aldehyde overtones.

Ramey: There weren't large color variations but by a slight margin this had the most gold.

B. Thompson: Frequently when oxidation begins it reminds you a little of cedar, pencil-box, cardboard. It has all of those notes. It's very soft and very short, without a distinctive character.

H. Thompson: I thought it had an almost fishy nose. It seemed a little metallic as well.

Stuart: I think that what you're calling metallic is what I was calling concrete. Is that oxidation, too?

Ramey: It seems this was oxidized in the cellar during filtration or bottling.

Stuart: I have a question about oxidation and Sauvignon Blanc. At the tasting for the medal winning wines at the San Franciso Fair there were several that were in clear bottles and several had a bronze color to them. Is that pinking, or just browning from oxidation? And why does that seem to be characteristic of so many Sauvignon Blancs? I've heard people talk about pinking in Sauvignon Blanc. There was some talk about leucoanythocyanins oxidizing and going to the pink side. Has anyone else run into this pinking problem?

Nalle: My hunch is it goes back to how you treat the must. You brown the juice, right? We brown the juice.

Stuart: I've never had a wine go brown and we don't add SO_2 until it's in the settling tank and then not very much.

Nalle: Many people think that Sauvignon Blanc is so delicate that it must be treated reduced throughout its life. And if they inadvertantly oxidize it in the last stages it may pink.

Clemens: Grand Cru has had the problem and it doesn't seem to be an oxidation problem, at least the wine doesn't taste oxidized.

Stuart: It's not alcohol being oxidized to aldehyde, it's phenols being oxidized to a different color phenolic compound.

Ramey: So it tires the wine, but it doesn't maderize it.

Stuart: To me, having that color in a glass of supposedly white wine is unacceptable.

Clemens: But the color goes away with time.

Nalle: The pinking doesn't really go away, it just turns tan.

Clemens: But is it really a function of oxidation, or is it a function of reduction?

Nalle: It's too reduced, and it is oxidized.

Stuart: I've seen it in Gewurztraminer and I guess it's related. I'd like to know what it is because I don't understand it and I'm a little gunshy about it because I've seen it happen to other people.

Nalle: When we make Gewurztraminer the juice is pink when it starts to ferment, but it's not pink when it comes out. The only way to get it to pink is to set it in the sunlight for three days.

Comments after the unveiling:

B. Thompson: This wine has gone downhill very rapidly. We had it just after bottling, and it seemed very much like the '83 we tasted. Why do some Sauvignon Blancs go downhill so quickly?

Ramey: It's possible to make, as the French do, white wines that last for years.

Stuart: But not all French whites last. I've had some pretty rotten Graves lately.

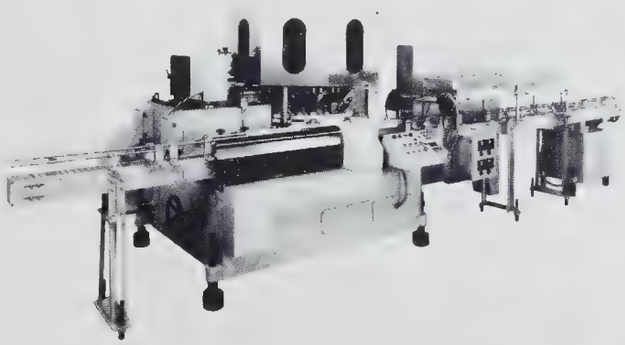
Clemens: I've had a number of California Sauvignon Blancs that were just fine five or six years down the line.

Nalle: We've made wines that were very nice as they went into the

The Finishing Touch...

for Fine Wine packaging

FOR THAT FINISHING TOUCH . . . Templock Heat Shrink Capseals combine aesthetics and function, enhancing both the integrity and the appearance of your product at the point of purchase. Templock PVC heat-shrinkable capseals are available in standard or custom colors, plain or printed, in cut bands for convenient hand application or in bulk rolls for machine application. Attractive appearance, low cost and suitability to automated application processes are but a few of the many reasons which make Templock capseals and labels an important element in the wine and beverage industry.



TEMPLOCK/AFM Automated Application Systems are also available if your requirements demand high volume production. A wide range of standard application systems are available for production speeds from 60 to 600 cpm. These systems accomodate virtually any size or shape container and can be installed with new or existing line equipment. Templock is the only manufacturer in America offering this full system capability.

Templock/AFM systems are in use today by many of the major U.S. wineries. Why do these leaders choose Templock PVC Capseals and Templock/AFM Application Systems? . . . Give us a call and discover how Templock can enhance your wine packaging.

TEMPLOCK CORPORATION
P.O. Box 40230
Santa Barbara, CA 93103
(805) 684-7676

TEMPLOCK CORPORATION
P.O. BOX 40230 Santa Barbara, CA 93103 (805) 684-7676 Telex 65-8432

A fitting tribute to any wine. Surlys™ wine sleeves, by Mack-Wayne.

They slip on easily, provide a beautiful custom fit. The plastic material has a memory, automatically adapts to the shape it's on.

With quick-release pull tabs, opening is just as easy.

You can apply Surlys wine sleeves to any 750-ml corked bottle with your existing equipment. They come in a wide range of colors. Can be silk screened or embossed.

Extremely cost effective, too.

For literature and samples, contact Mack-Wayne Closures, 1235A Route 23, Wayne, NJ 07470, 201-696-1212. Or Sutton Place, P.O. Box 1493, Santa Rosa, CA 95401, 707-584-9711.

MACK-WAYNE CLOSURES

DIVISION OF THE WEST COMPANY

bottle and then deteriorated. And, if you go back through the notes you see that the wine was kicked more than it needed to be kicked, so that its reservoir of oxidation capability was used up early on. The wine stuck, or had a sulfide problem and had to be aerated, acidulated, chaptalized...punished a little bit. Those are the wines that invariably took a nose dive a year or two after bottling.

Neel: We can't chaptalize, but we can acidulate.

Ramey: We can chaptalize with concentrate.

Nalle: And I also meant water.

1982 Martin Brothers, Paso Robles

Comments before the unveiling:

Neel: It was the most citric of the bunch.

Stuart: It had a salty, brackish taste so it lacks freshness. Varietally intense, but not clean. It had a peppery/minty kind of herbaceousness—figgy, heavy, slightly skunky.

Ramey: This was my first choice of this flight. Nice restrained Sauvignon Blanc nose, complex, little autolysate again (not simply fruit). Tart but not too tart, a good seafood wine. It has a real delicate mouth, completely lacks any bitter phenols; it's a real palate pleaser. It lacks richness, but it's a nicely styled wine.

Nalle: It was impeccably made, but that character didn't come out of the vineyard.

B. Thomspon: I liked it; it reminded me of melon. It didn't start out tart, but it finished tart and I don't quite understand how that happened. One other virtue was quite a long finish that was very true to the nose.

Nalle: That saltiness that Jack mentioned bothers me; it's like high acid and high pH. Not grossly high pH but high enough.

Comments after the unveiling:

Stuart: This has what I call a reduced, green Sauvignon Blanc character.

B. Thompson: From picking too early?

Stuart: You can't pick Sauvignon Blanc very ripe because anything over 21° Brix will be over 12.5% alcohol.

Clemens: I'm curious, anything over 21° Brix you'll get more than 12.5 % alcohol?

Stuart: At least from this vineyard, and with the yeast we use. I don't know if these are conversion rates and the yeast are more efficient, or if we're just getting more accurate sugar samples than we used to. Anyway, what we measure as 21.5° Brix in the field will make wine approaching 13% alcohol. So if you want to pick Sauvignon Blanc over 22° and certainly at 23° you're going to have a 14% or more alcohol Sauvignon Blanc and you better have something to blend it with.

Ramey: We find a .6 conversion, but you know Jack, we find a great difference in what you find in the field and what you find in the sugar shack and what you get in the tank. We base all out conversion factors on what we have in the tank and typically that's lower sugar than what we measure in the field.

Stuart: I always measure with both the refractometer and the hydrometer and no matter how hard I try to calibrate them they're always at least a half point difference and usually the hydrometer is higher.

1983 Robert Mondavi, Napa Valley

Comments before the unveiling:

Clemens: This had the weirdest nose I've ever come across in a Sauvignon Blanc; it was like carnations.

Nalle: It was just toasty French oak.

Stuart: I got a candy smell.

Ramey: Fruity, soapy, non-varietal in any case.

Nalle: Quite like Chardonnay.

Stuart: It's herbal but it seemed that it's either a brand new wine going through bottle shock, or it was just coarse.

Ramey: I thought it was just harsh. Low acid, phenolic bitterness, harsh.

Nalle: But it's saleable. Six months in the bottle and that will be toned down a little bit. Good balance for a full-flavored wine.

Stuart: It smelled a little bit like the cardboard that you get back with the shirt from the laundry. It's kind of a bottle shock smell.

B. Thompson: It struck me as the most alcoholic of the group.

Comments after the unveiling:

Stuart: That probably was just bottled, so this one deserves another look in six months.

Ramey: I know another problem they might have. They've given priority to harvesting Chardonnay, so the Sauvignon Blanc might get too ripe.

Stuart: Do you think this candied smell is part of the bottling oxidation? Is that a low level of aldehyde? It's almost the smell you get when a sliced apple has been sitting on the counter for an hour.

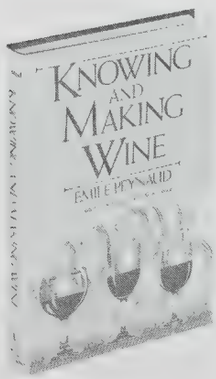
Nalle: If the wine is left in new French barrels for a while, even if the free SO_2 is up there, it's the toasty quality that changes the fruit into a candied quality.

1983 Simi Sauvignon Blanc, Sonoma County

B. Thompson: I really liked this one. Rick Forman used to have a phrase for Sauvignon Blanc he called 'stinky ripe', and this had that. I think this is probably as close as you can get to picking the fruit when it smells the best, a little peach overtones, a freshness, a delicacy of texture. I immediately started thinking about eight or ten things I wanted to eat with it, which is a mark of something that I really like.

ENGLISH EDITION JUST RELEASED!

"The Essential digest of Enology by the World's most respected wine scientist."



- Mechanics & Methods of Tasting
- Microbiology of Wine
- Vinification Techniques
- Storing & Aging
- Clarification & Stabilizing
- Bottling, etc.

$34.95

ORDER TODAY! Call Toll Free:
In California: 800-231-WINE • Outside California: 800-242-9462
VISA & MASTERCARDS accepted • $2.00 per order postage

The Wine Appreciation Guild

155 Connecticut St., San Francisco, CA 94107

CRIVELLER COMPANY

supplier to

SMALL & LARGE WINERIES

WITH

- GRAPE PROCESSING EQUIPMENT
- FILTRATION EQUIPMENT
- BOTTLING EQUIPMENT
- EQUIPMENT FOR TREATMENT OF JUICES AND WINES
- STAINLESS STEEL TANK ACCESSORIES
- PISTON PUMPS
- CHEMICALS & FILTER SHEETS
- YEASTS AND ENZYMES
- OENOCYANINE AND OTHER SPECIALTIES....

CANADA
6863 Lundy's Lane,
NIAGARA FALLS, ON.,
L2G 1V7
Ph. (416) 357-2930

U.S.A
P.O. Box 162
Lewiston, N.Y.,
14092

Telex 061-5446

SEE US AT A.S.E.V. BOOTH 164

Nalle: If I had to enter a wine in all the fairs for a year, this would be the one. This is the most proper, even-balanced, mainstream, premium Sauvignon Blanc I've tasted in quite a while. It's almost too good. It doesn't have any edges, any pimples—it's the Christie Brinkley of Sauvignon Blancs.

Clemens: I don't know if it has a lot of Semillon in it or not, but it does have that figgy quality and it's herbal qualities are restrained.

Stuart: I got a sweet grass, caramel, dried fig, river gravel aroma out of it. Very racy, well-made, intense. Again, I got a kind of blended character out of it as though it's the best of several lots of wine blended together to come to a standard, but it's a very high standard and a nicely made wine. Surprisingly rich for the tartness in it.

H. Thompson: I think this one should be called Fume Blanc because it's the only one we've tasted that has a smokey quality, also flinty, good fruit, good acid. The only fault I could find is that it finished a little short.

Ramey: I agree with most comments, but I want to dock it for coarseness. I ranked it third in this flight. It's a young wine, fresh, well-cared for, but there is a coarseness and I think that some isinglas or some egg white or some combination of PVPP could have done a job on rounding out the mouth of this wine.

Stuart: It does have an astringency, but it's surprising how accepted a certain level of astringency is in white wines.

Nalle: Some of that might be the alcohol.

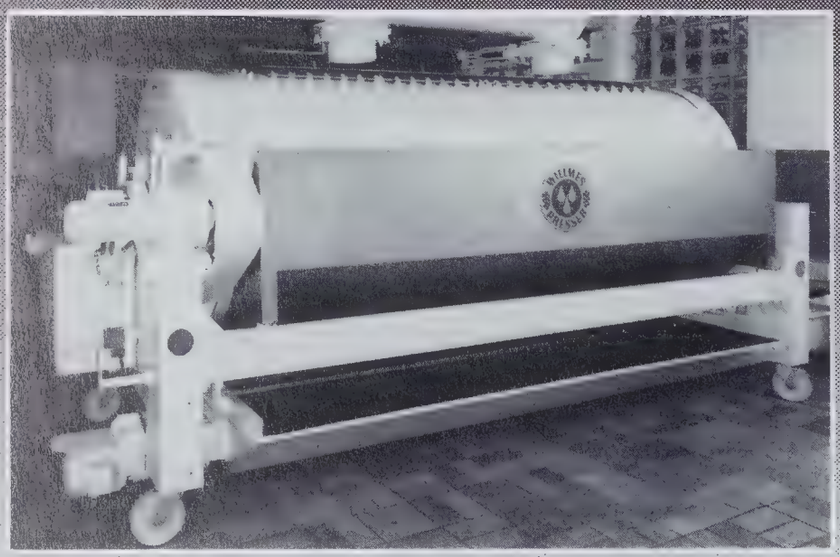
Comments after the unveiling:

Ramey: It's got nine months more bottle ageing to go before it's released.

Nalle: I got an autolysis character in there like a little lees contact.

Ramey: Completely.

WILLMES... Always ahead



- Outstanding juice quality
- Maximum yield
- Extremely low solids
- Solid construction
- Low maintenance
- Reliability
- Spare Parts and After-Sales-Service guaranteed in the U.S.

SEN MACHINES INC. - U.S. REPRESENTATIVE FOR:

- SEITZ ENZINGER NOLL - Bottling and filtration equipment
- SEITZ FILTER WERKE - SWK Filter Sheets and Membranes
- MORLO - PVC heat-shrink capsules
- ERBSLOEH, Geisenheim - Wine and Juice fining materials

SEN MACHINES INC.
3095 KERNER BLVD., SUITE G SAN RAFAEL, CA 94901-5480
TELEPHONE: 415-457-5155 TELEX: 288978
SUBSIDIARY OF SEITZ ENZINGER NOLL MASCHINENBAU AG AND SEITZ-FILTER-WERKE THEO & GEO SEITZ • BAD KREUZNACH, W. GERMANY
Exclusive East Coast Representative:
JUERGEN LOENHOLDT - R.D. 1, Route 14, Himrod, NY 14842 (607) 243-7568

Don't prune us out!
Subscribe to
Practical Winery. Now.

TONNELLERIE MERCIER

Quality & Tradition

French Oak Barrels & Tanks

- Inventory in Stock Locally
- Warranty Work and After Sales Service
- Quotation on Requirements

Contact our Agent:
Bob Rogers
CUSTOM COOPERAGE
1194 Maple Lane
Calistoga, CA 94515
Tel.: (707) 942-6902

Clemens: Why is there a sweetness and richness to this fruit? It's less austere than the others, and at the same time it's still delicate.

Ramey: Probably vineyard selection. It's a blend of three vineyards. But it's not very ripe, '83 wasn't a ripe year.

Clemens: Does it have Semillon?

Ramey: Only 5%.

Clemens: So negligible. I'm surprised. I would have thought that a wine with that neutral figgy character with only a slight herbaceousness would be mostly Semillon.

Ramey: That's the vintage. The grapes are essentially the same, with one change from the '82, but the vintage was just much less herbaceous. We worried about that, but there was only so much we could do. The Semillon increased the delicacy but it decreased the varietal character. Beyond 5% the improved delicacy wasn't merited relative to the decrease in varietal character which was low in the first place.

Neel: So the grassy character is more from the vintage than from the vineyard?

Ramey: No. The vineyard is very important. Part of the way we tame Sauvignon Blanc is by vineyard blending. 40% of these grapes have negligible Sauvignon Blanc character. 60% from two different vineyards have pronounced Sauvignon Blanc character. If we have 12,000 gallons of raw material we can end up with a 9,000 gallon blend and kick the other 3,000 into our Chardonnay and it comes out as 2% of the Chardonnay, which is nothing. It's the opposite of what you might think, the heavy river bottom soil vineyard is less herbaceous and the more gravelly soil vineyard is much more herbaceous. The vines are less than ten years old. I don't know why one is more herbaceous than the other.

Nalle: In the industry we have a huge amount to learn about Sauvingon Blanc and Semillon and how they go together. People think that a less herbaceous Sauvignon Blanc is one with a lot of Semillon in it and that's not necessarily true. We have some idea of what Semillon is, but what is that based on? There are so many variables that to talk about Semillon as the most important factor is a joke. We have a generation ahead of us to figure that one out.

Ramey: Even in terms of Sauvignon Blanc relative to Semillon, we have more climatic variation in 15 miles of Sonoma County than they have in all of Graves where the Sauvignon Blanc/Semillon blend got its start. The Sauvignon Blanc from Forestville is going to be so different than that from upper Alexander Valley that it's a whole new ballgame here.

1982 Silverado Vineyards, Napa Valley

B. Thompson: How about canned asparagus?

Clemens: There is more of that now, but on first pouring it struck me very distinctly as crisp bell pepper. It's interesting that this is a character I saw a lot of six or seven years ago; it has almost died out entirely in the styles of Sauvignon Blanc now. I don't know how someone would go about achieving that style, but if done correctly (as this is) it's an interesting style.

B. Thompson: What's interesting to me is that you can find this character a lot in the Central Coast. Paul Masson, Ballard Canyon, J. Carey, often have that character.

Clemens: In the past I interviewed several winemakers who produced that more vegetal style and they all said they got it by picking below 22° Brix. Now all of you say you pick under 22° Brix and most of the wines we've tasted are devoid of that character. Are you losing that character as the vines mature? Or is there another logical explanation?

Nalle: It's a reasonable idea, but there are too many variables to really know.

B. Thompson: I read the last *PRACTICAL WINERY* Sauvignon Blanc article before coming here and there were some interesting contradictions. Some said lower sugars give you less varietal character and some said the opposite. Which is correct?

Stuart: Perhaps both, depending on the vineyard. We don't know enough yet. I agree with Dave that the vintage plays a part. We have a very young vineyard. We've done only three harvests off of it and each vintage has had a different character. It's at a different stage of the vines' development, a different structure, vigor, and vegetative growth each year.

Nalle: This is very complex wine. Dave Stare used to make a vegetal style but over the years he's cleaned up his Sauvignon Blanc to the point that they aren't as complex as this wine. I have some of Dry Creek Sauvignon Blancs that have a good slug of French oak and an almost custard-like character, toasty, with an herbal background, bell pepper or asparagus.

B. Thompson: The older they get the more they smell like an Italian delicatessen. Very complex. Olives, garlic, bell peppers.

Stuart: This wine has more of that green bean character than the others. I also found a scorched paper component in it in the beginning, but when it had been in the glass a while it developed a very intense herbal/spicy character. There's a richness in the flavor. Fairly well-balanced.

Comments after the unveiling:

Stuart: I don't know if it was me or the wine but that scorched paper character sort of bothered me.

Ramey: It's not toasty from the oak, the oak wasn't obvious.

Stuart: This is from a vineyard just across the river in Yountville, very deep soil. '82 was the first year we had a good canopy, and it's much grassier or herbal than either the '81 or '83. That may have something to do with it. I think sun exposure to the clusters reduces the acids in Sauvignon Blanc, but a good canopy is hard to avoid. If you want sun exposure in an established vineyard you have to go in and hedge. Then I have to go back to what Dave said about vintage differences; I've heard from more than just Simi and Silverado that '83 seemed to be less intense, less herbaceous Sauvignon Blanc than '82. I don't know for sure, that's the wonderful thing about winemaking.

B. Thompson: Were there discernable differences in the vineyards in '82 and '83?

Ramey: I don't get out in the vineyards enough to know.

Stuart: To get back to this wine, there were two separate lots. The biggest lot, about two thirds of the total, was picked at 21° Brix. (We use tank average as a reference.) It was very grassy, very high acid, and smacked of Sancerre. The other third was picked at 22.7° Brix. Both were aged in small Taransaud barrels and small upright tanks. Half the barrels had been used once for the '81 Sauvignon Blanc, the other half of the barrels had been used for two months for the '82 Chardonnay. It was in those barrels for two months and in the uprights for two months.

1983 Inglenook, Napa Valley

Comments before the unveiling:

Nalle: It didn't strike me as flat out egg. I got a cold fermented sort of character.

B. Thompson: This one struck me as if the winemaker was aiming at Graves.

Nalle: I don't think this is a terrible wine but it suffers from the high company here. There is some good fruit underneath. It's simple but it could age into a good wine.

Comments after the unveiling:

Ramey: It almost has the smell of high-proof. What's the alcohol?

Neel: It's stated as 12.5.

Nalle: I think it has a spicy, dry grass character.

1982 Simi, Sonoma County

Comments before the unveiling:

B. Thompson: Here's another one that seems patterned on a Graves. Rich fruit and a slight burnt match stick character. The varietal character is very subdued under the fruit. It's a very stylish wine.

Stuart: I liked this. There was a dried flower kind of aroma, perhaps a little bit of a candied character to the fruit, good acid. I also picked up an earthiness in the flavors which gave it some complexity.

Nalle: Of all the wines we've tasted, this is the most French. It tastes almost reduced. It's leesy, yeasty, high acid, very controlled.

Comments after the unveiling:

Clemens: I have some reservations on this wine's staying power. On the first pass I picked up a slight sulfide problem. Now that has aired off and it's leesy, earthy in a positive way. It's complex, but is it clean?

Nalle: This is the future of winemaking in California, this complexity that comes from other things than simple fruit. Barrel fermentation, lees contact. We used to make wines like this in California, and in the '70's we got too clean, too antiseptic, and the wines were simple and they didn't last. This kind of wine, on the other hand, has all the complexity you'll ever want and I think it will develop wonderfully well.

B. Thompson: I agree; our wines have been too clean. I think we've seen the beginning of a trend in the last few years back toward more traditional methods to achieve more complex wines. I hope

whole heartedly we'll see more of these complex yeasty sort of wines.

Nalle: Did this have lees contact?

Ramey: Completely. One third was barrel fermented and left on the gross lees, and two thirds was tank fermented and racked, but still fermenting so that after a month or so there was a good build up of yeast that had settled out. We didn't even bentonite the wine. We did fine the juice with five pounds of bentonite per 1,000 gallons of juice, but not the wine. When we fined we used PVPP.

Neel: New or used barrels?

Ramey: One and two year old Taransaud, no char.

Clemens: Any Semillon?

Ramey: None. This is 100% Sauvignon Blanc, 50% from Chalk Hill and 50% from Alexander Valley. As I mentioned before, the heavy soil in the Alexander Valley produced a very delicate, non-grassy, pear-like wine, while the Chalk Hill with the lighter soil gave us a bell pepper character.

Nalle: I wondered if it might have gone through ML because it had that oily texture.

Ramey: No malolactic at all.

1982 Inglenook, Napa Valley

H. Thompson: It had a very subdued nose like sweet grass, citrus flavors. I thought it odd that it was both soft on the tongue and at the same time sharp in the throat in the finish. Overall uninteresting.

B. Thompson: This one had strong dried grass flavors, but the nose was too oxidized and the balance was off. It was both flat and hot.

Stuart: More like Chenin Blanc than Sauvignon Blanc.

1983 Silverado Vineyards, Napa Valley

Comments before the unveiling:

Ramey: Simple, fruity, estery, gewurzy, lilac, very young, low Sauvignon Blanc nose, no Sauvignon Blanc, undeveloped, spritzy, thin.

Nalle: Pale, estery, rose petals. More like Gewurztraminer than Sauvignon Blanc. Not much style.

Stuart: I put it in the same camp as the '82 and '83 Simis and the '83 Inglenook, although not as stylish as the Simi. It seemed to have the same earthy, figgy, spicy character.

H. Thompson: It had the faintest nose of the group at first, but it opened up to good varietal grassiness plus some vanillin, harmonious in the lighter style, leans to tart but has fruit to balance. The finish was a tad hot.

B. Thompson: Of all these wines I thought this depended on its oak. It was built on the oak rather than built on the varietal. But I didn't find it unpleasant; it had some varietal character and was a fairly decent wine.

Clemens: I rather liked the nose. It had that wonderful thyme-like aroma, it was restrained, and it had lovely fruit on the palate.

Ramey: There's a funny Alsatian pungency that puzzles me. Rose petals. Gewurztraminer.

B. Thompson: I think the fruit is good fruit, but it seems like it is trying to live in very fast company and may be being harmed by that. But I still do have the feeling that the fruit needs the oak to complete it; it doesn't have the great character of fruit that some the others have.

Comments after the unveiling:

Stuart: It's the same 12.5 acres that the '82 came from. The only differences are that the vines were a year older, it's a different vintage, and we got six tons to the acre as opposed to four in '82. This was the first mature crop from the vineyard, fifth leaf. This is

Australian Society of Viticulture & Oenology

PROCEEDINGS

The Australian Society of Viticulture and Oenology, Inc, with over 400 members, has proceedings available from several recent one-day seminars. Description and cost are below:

Grape Quality

Assessment from Vineyard to Juice Preparation — 77 pages. Topics: pH & Acidity Regulation in the Vineyard by Water Supply; Manipulation of Wine Quality Within the Vineyard; Grape Quality Assessment; Juice Preparation Procedures. Cost: A$15

Fermentation Technology

94 pages. Topics: Basic Yeast Technology; Yeast Propagation; Effect of Solids on Fermentation Rate; Yeast Growth & Nutrition; Botrytis cinera in Winemaking; Roto-tanks for Red Wine Fermentation; Carbonic Maceration; Small-scale Winemaking in Varietal Assessment; H_2S Formation. Cost: A$15

Coonawarra Viticulture

63 pages. Topics: Mechanized Viticulture in an Australian cool climate area including mechanical pruning, canopy management, minimal pruning, use of herbicides and ethephon. Cost: A$15

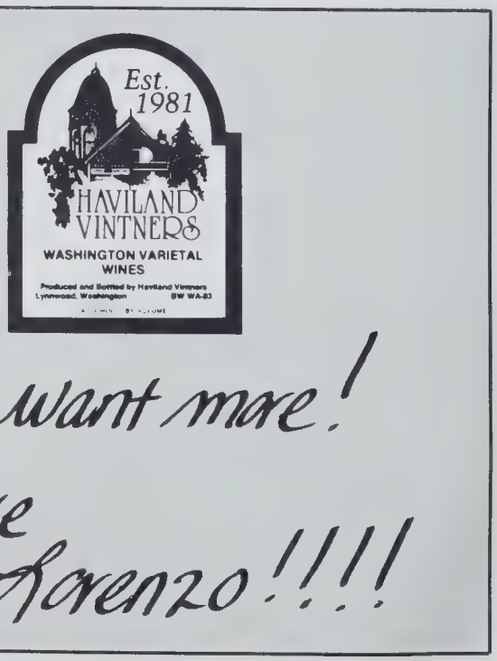
Malolactic Fermentation

143 pages. Topics: Taxonomy; Ecology; Physiology; Metabolism; Isolation and Identification of Lactic Acid Bacteria; Management of MLF; Development of Commercial Cultures; Simultaneous Inoculation; Culture Preparation; Commercial Experience. Cost: A$20

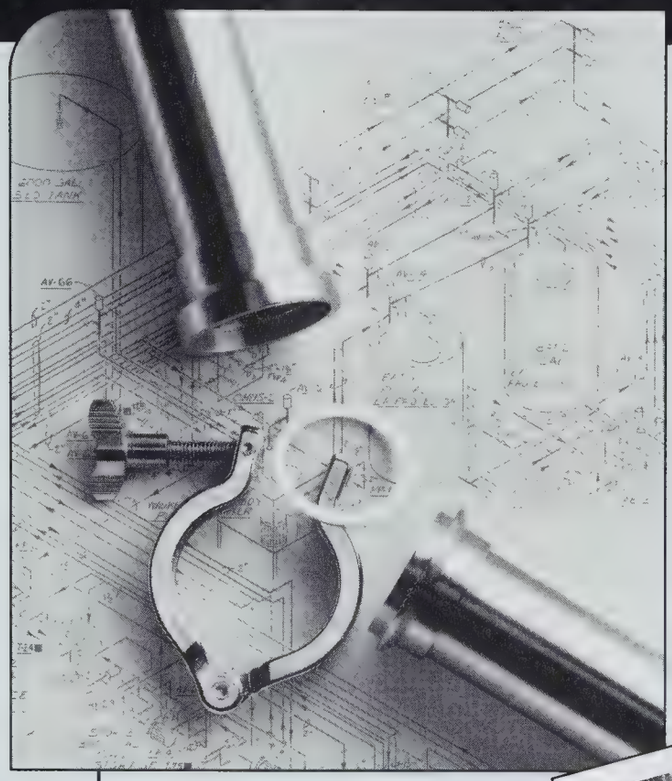
A complete set of the four proceedings is available for A$60. This amount covers handling and postage by sea mail. For surface airlifted postage add A$5 to the cost of each proceedings and A$8 to that of the set. Orders should be sent to The Secretary, Australian Society of Viticulture and Oenology Inc., c/o The Australian Wine Research Institute, Private Mail Bag, Glen Osmond, SA 5064, Australia.

A complete proceedings (450 pages) of the Fifth Australian Wine Industry Technical Conference held in Perth, November 1983 is available from University Extension, University of Western Australia Nedlands, WA 6009, Australia. Cost of the proceedings is A$40 by sea mail; please make drafts payable to University of Western Australia - Extension.

The Sixth Australian Wine Industry Technical Conference is being organized by the Society in conjunction with the Australian Wine Research Institute to be held in Adelaide, July 14-17, 1986. Contact the Institute for further details.



Being good at systems made us better at fittings



More options

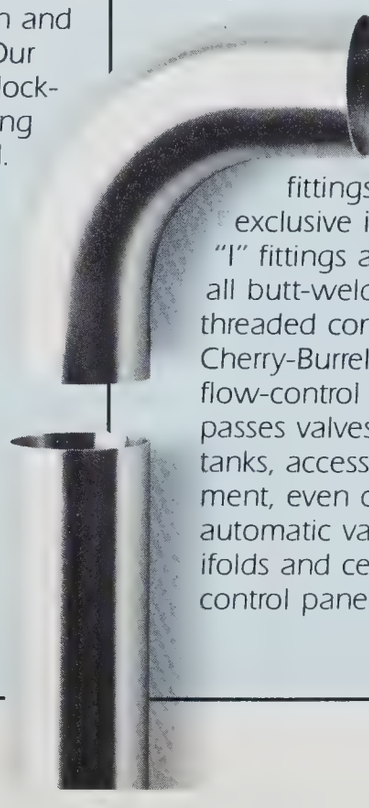
Installing as much equipment, as many systems, for as many industries in the U.S. and around the world as we do, we appreciate the flexibility of a broad fittings line. That's why Cherry-Burrell manufactures the broadest fittings line of all.

For example, when we discovered there was no sanitary fitting available that could withstand certain pressures, vibration and weight, we invented it. Our "I" line was the first interlocking, quick-disconnect fitting available in stainless steel.

We began offering our fittings in 316L low-carbon stainless as standard after finding it more cost-effective in a number of our installations; our fittings customers now agree.

More flexibility

Today, Cherry-Burrell manufactures the most complete line of stainless steel, liquid-flow system components available.

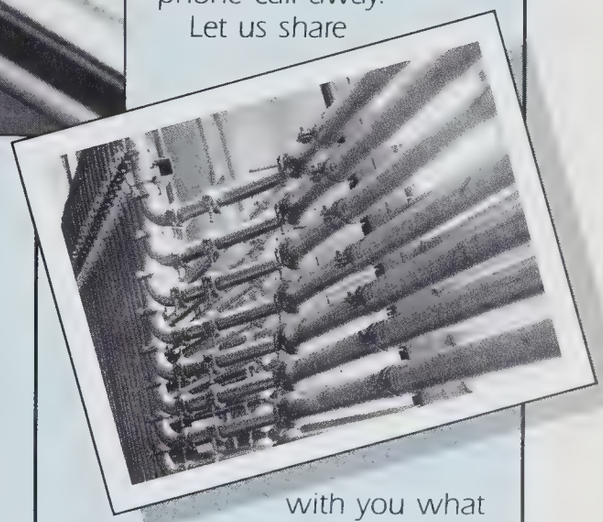


From the quality, face-to-face "S" fittings to the exclusive interlocking "I" fittings and including all butt-welded and threaded configurations, Cherry-Burrell's sanitary flow-control line encompasses valves, pumps, tanks, accessory equipment, even complex automatic valve manifolds and central remote-control panels.

More service

Cherry-Burrell's nationwide network of distributors can put the stainless steel fitting or any Cherry-Burrell flow-control system component where you need it when you need it. And for systems counseling, Cherry-Burrell's applications engineers are only a phone call away.

Let us share



with you what we've learned about fittings from years of systems design and installation. Call 1-800-553-8867 or write us for literature and the name of your nearest distributor. Cherry-Burrell Corp., 2400 Sixth St. S.W., Cedar Rapids, IA 52406 USA

CHERRY-BURRELL

A Second 2 Century of Innovation

a six ton Sauvignon Blanc vineyard; if you don't put six tons on it, all you get is leaves. It might even be an eight ton vineyard.

B. Thompson: Just tasting fresh must, did it have the kind of intensity of character that the '82 had?

Stuart: I knew from the beginning that it was going to be different from the '82 just because the vineyard was so different looking, bigger vines, more shade on the fruit (which I actually thought would do more to continue that grassy, herbal style of the '82.) And in fact the wine is grassier than it seems; I think it's still going through bottle shock. Again there were several components picked relatively green and several components picked relatively riper. We had one lot that approached 14% alcohol and others that were around 12.1%, and the alcohol of the blend is 12.9 compared with 12.8 for the '82. This has never seemed as intense as the '82 at any stage of production.

B. Thompson: Did you use about the same ageing regime?

Stuart: One lot was never in oak at all; half the blend was aged only in uprights, and then only the two relatively riper lots had any significant time in oak and that was oak used two and three seasons previously. Nothing was in barrel for more than three months, so I'm not sure where you're getting the oak impression from.

Neel: What was the logic behind putting the riper lots in barrels?

Stuart: They had the character to stand up to some oak extract.

Neel: This was all tank fermented?

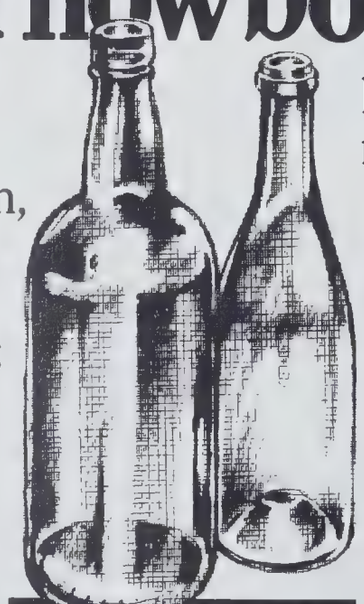
Stuart: Yes. Even at its most complex it's a different wine than the '82, which puzzles the hell out of me. I don't know why they're so different. The harvest regime and the ageing techniques were within the same spectrum. I think it must be the age of the vineyard and the vintage.

H. Thompson: If you go back to the first flight, there is almost a parallel between this and the Mondavi '82 and '83. The '83 Mondavi was much lighter than the '82.

We talk cork, capsules and casks.

...and now bottles!

We've always sold corks (printed plain, treated, un-treated, champagne); we added wine capsules, champagne



hoods, oak maturation casks . . . *and now we've got bottles—* French, German, Portuguese and Spanish!

Anthony Smith & Associates Pty. Ltd.
1 Days Road, Croydon Park, S.A. 5008 Telephone: (08) 46 9321 Telex: ASCORK AA 87116

"She
gave me
a wine of
the hillside which
seemed to me to
come from Heaven itself,
but when I begged
some of her and
carried it back to
the Chateau
it savaged me.
There was alchemy there,
either in the air
or in her fingertips."

Lord Byron

SAUVIGNON BLANC AND FOOD

Harolyn and Bob Thompson

According to the cellarbook, our consumption of Sauvignon Blanc went up again last year. It may be bending our diet.

Like all wines of strong character, Sauvignon Blancs are at their best with a comparatively narrow range of dishes. But unlike some of the other intensely aromatic whites—Gewurztraminers and Muscat Blancs, for example—Sauvignon blancs fit better with a meal than they stand alone as sippers.

In all their styles and shadings, the aromatics of Sauvignon Blancs are close to leaves and stalks, and somewhat distant from fruits and other sweet, easy foods. Because of this, even the subtlest ones find their most pleasing echoes when they keep company with herbs and vegetables, and their most graceful contrasts when the foods are creamy or meaty rather than fruity or sweet.

Still, California Sauvignon Blancs can spread themselves across a reasonably broad culinary band because they are not all of one, homogenous character. We have divided them into several sub-groups, ranging from fruitiest to most vegetative.

At the fruity end, the herbaceous (grassy, asparagus-like) flavors are subtle to begin. In addition these wines have an overtone of fruit, for us closer to melon than anything else. Balverne (82), Beaulieu Vineyard (81, 82), Kendall-Jackson (83), and Stonegate (83) are solid, recent demonstrations. Simi (82, 83) comes close, thought it has tended to bridge the gap to the next cluster. Inglenook (83) fits the same slot; Silverado Vineyards edges in here, too.

The character we call sweet/grassy or oily/grassy has been exemplified in recent seasons by Monticello (especially 81) and Robert Pepi (82, 83). Chateau St. Jean, St. Jean Vineyard, has been another example, and Martin Brothers has some of this character.

The next character is grassy/grassy. Year in and year out, the prime examples come from Dry Creek Vineyards and Preston Vineyards. Kenwood Vineyards and Glen Ellen Winery do not lag far off the pace. Creston Manor has some of it, though more as a suggestion than a statement.

Finally there is the vegetative end, an asparagus to cooked asparagus quality most easily found in Santa Barbara County, but also in Monterey. Zaca Mesa and Ballard Canyon are consistent examples; and Paul Masson (81,82) has demonstrated it.

An extra possibility is Sauvignon Blanc styled after Chardonnay—blended with Semillon, barrel-fermented, aged on the lees, or all of the above. Robert Mondavi, especially Robert Mondavi Reserve, has been the bellwether. Brander is similar in style, though distinctly different by regional character.

From the other side of the coin—food—Sauvignon Blancs have four roles, largely based on the steps in their range of character. There is Sauvignon Blanc as perfect companion to garlic, alias Sauvignon Blanc for its own sake. Which is to say grassy.

Sauvignon Blanc can take the place of a good lager, especially if it mixes a faint charred or smoky note with subtle herbaceousness, as beer can. This style complements Mexican dishes flavored with cumin.

Sauvignon Blanc can replace Chardonnay readily if it has been styled after Chardonnay, meaning above all that it has been well marked by ageing oak.

And there is Sauvignon Blanc as an alternative to red wine.

To this point, we haven't been able to develop a complete unified theory about which pairings of Sauvignon Blanc and food produce the most heartfelt sighs of pleasure, but we have generated a list of combinations that seem to mate well consistently. We offer it to provoke comparisons with the experiences of others. A shorter supplementary list of matches that have made us groan is given for the same reason.

Pleasures

- *Chicken 40 Cloves of Garlic and other garlicky chicken* This is the dish that launched us into the theory of echoes and contrasts in pairings when we were working on *American Wine and Cooking* with Shirley Sarvis. We started indexing Sauvignon Blancs as 40-clove wines, 30-clove wines, etc. Pungent grassy/grassies are the 40-cloves types.
- *Chicken, plain* Any one at all
- *Chicken in creamy sauces* Sweet/grassy, for the contrast
- *Chicken basted in herbs* Sweet/grassy for echo, melony for contrast
- *Mulligatawney soup (chicken, garlic, onions, many spices)* Sweet/grassy
- *Swiss enchiladas* Grassy and sweet/grassy head the list of nominations.
- *Chiles rellenos* Grassy for the echo, melony for the contrast. In either case, most successful when the chilis aren't too fiery.
- *Snapper Yucatan (cooked in white wine with finely chopped garlic, onion, tomatoes and green peppers, and seasoned with black pepper)* Grassy or sweet/grassy
- *Grilled white fish with cumin butter* Grassy
- *Grilled or poached white fish with cheese* Melony, and subtle of that
- *White fish in creamy sauces* Any varietally subtle bottle styled after Chardonnay
- *Lobster or shrimp Newburg* Any Chardonnay-like example
- *Pasta with garlicky sauce* Grassy/grassy
- *Vegetable quiche* Sweet/grassy for the echo, melony for the contrast
- *Mushroom quiches, crepes, or souffles* Definite grassy or sweet/grassy varietal, but styled after Chardonnay
- *Curried soup* The soup can only be lightly curried. If it is, it will punch up any herbaceous character, so melony is a good place to start. (If it is heavily curried it will punch the lights out of any wine known to man.)
- *Baked pork chops stuffed with bread, onion, and sage dressing* Grassy, herbaceous, since it is standing in for Cabernet Sauvignon.
- *Baked pork roast with prune stuffing* As above, or melony to echo the fruit of the prunes.
- *Boneless leg of lamb braised in white wine, with vegetables and garlic* Back to a stand-in for Cabernet.

Pains

- *Pearl onions* Grassy Sauvignon Blancs turn sweet little onions into wee balls of vetch.
- *Cold cracked crab* The combination is not evil, but something from the ranks of Johannisberg Riesling (echo) or Chardonnay (contrast) always does better with sweet crab meat.
- *Scallops* As for crab.
- *Washingtons and other sweet clams* As for crab.

Juice Bentonite Fining

David Ramey, Matanzas Creek Winery

Since the harvest of 1980, Simi Winery, Healdsburg CA, has been achieving actual or nearly commercial heat stability by bentonite fining grape juice prior to fermentation.

Heat stability at Simi was defined as: 1) 24 hours at 38°C, followed by 24 hours at 4°C, without an increase in haze when viewed through a high-intensity light, and 2) 24 hours at 60°C, followed by 24 hours at 4°C, with an allowable haze increase but without flocculation. Table I shows bentonite levels used on juices and wines produced in 1981 through 1984.

Fining with bentonite is often thought to remove body and aroma from wines, and many winemakers have bemoaned having to heavily fine a special wine just prior to bottling. Sauvignon Blanc and Gewurztraminer have been particularly troublesome in this regard.

The logic behind juice fining is that non-selective fining agents such as bentonite may remove fewer flavor components from juice than from wine, which contains fermentation and ageing by-products in addition to natural grape constituents. The cation (+) exchange process which replaces sodium ions on the bentonite surface with positively charged proteins may remove, as well, other positively charged molecules.

A second advantage of juice fining is to allow a more precise determination of bentonite required in the final wine blend, and then be able to match the laboratory results in the cellar. The possibility that lab and cellar finings will differ can be minimized by working in the one lb/1,000 gallon range rather than at five lbs/1,000 gallons. This may be achieved by preliminarily removing some of the heat labile protein at the juice stage, followed by a light finishing fining in the masterblend tank, if necessary.

The cost saving between fermentation lees and bottling-blend lees is also advantageous. The winery controller would much rather lose the dollar-value attached to new wine than that assigned to wine which has been cellared for 4-15 or more months, particularly if that wine has spent much time resting in $250 French oak barrels. It has been the observation at Simi that bentonite settles more compactly in fermenters than in finished, more clarified wine, where the fluffy nature of the lees is often a source of complaint. This is most likely due to the great quantities of yeast cells which settle down on top of the bentonite and compact it as the fermentation finishes.

The sequence of cellar operations at Simi has been:

1) Settle or centrifuge the juice to remove grape solids, which would foul the bentonite and reduce the efficiency of protein removal.

2) Add whatever acid is intended, to drive more proteins to a positively charged state and thus make them removable by bentonite. This is based on theory, not practical experimentation. It may be that the juice should be fined prior to acidulation since protons themselves may reduce bentonite efficiency through competitive binding.

3) Add bentonite, mixing thoroughly with a propeller mixer in the racking valve while circulating juice from tank bottom to tank top by pump.

4) Add any yeast nutrient desired.

5) Add yeast over the top without circulating. This has proven to be critical, as bentonite may cause poor initial fermentation by pulling the yeast inoculum to the bottom of the tank.

Bentonite preparation at Simi has been: two gal of 180°F water/lb of sodium bentonite (KWK). Add bentonite slowly while mixing; allow three days for the bentonite to hydrate prior to use.

Two common concerns voiced by other winemakers have been: 1) Doesn't the bentonite remove nitrogenous compounds which are necessary for a strong fermentation? 2) Do any off-flavors develop from fermenting on bentonite?

Table II shows the analyses of ten lots of Chardonnay and Sauvignon Blanc before and after bentonite fining. Ammonium levels are unchanged, as are free amino nitrogen (FAN) levels; the small apparent increase in FAN is probably due to analytical error. It can be seen that bentonite is not removing common nitrogenous compounds associated with healthy fermentations. As far as development of off-characters, this has not been a problem in four vintages at Simi.

How does a winemaker decide how much bentonite to add to a specific lot? Since 1981, Simi has been using Bentotest ™, a proprietary compound containing phosphomolybdic acid which precipitates proteins. The following procedure has evolved and is performed on the first representative delivery from each vineyard:

TABLE 1

Wine	Vintage	Average Juice Bentonite Addition (#/1000 gal)	Final Wine Bentonite Addition (#/1000 gal)
Sauvignon Blanc	1980	4*	0
	1982	5	0
	1983	5	0
Chardonnay	1980	1.5*	1
	1981	0-2	0
	1982	2-4	0
Chenin Blanc	1980	1*	0
	1981	3	0
	1982	2-4	1
	1983	2	0
Rose of Cabernet	1980	2*	0
	1981	0	1
	1982	0-2	½
	1983	2	¾
Gewurztraminer	1979	0	4
	1980	2*	6
	1981	5	0
Muscat Canelli	1982	1	4
	1983	5	0
Semillon	1983	1	0

** 1980 must fined in unsettled drain & press tank*
1981-83 musts fined after settling, in fermenter

"I read it in Practical Winery!"
Each time you reference PW, our foundation becomes stronger.

TABLE 2

Ammonium ($NH4^+$) and Free Amino Nitrogen (FAN) Levels, in Chardonnay and Sauvignon Blance Juice Before and After Cellar Bentonite Fining

Variety	Tank #	$NH4^+$ (mg/1) Before	$NH4^+$ (mg/1) After	FAN (mg/1) Before	FAN (mg/1) After
Chardonnay	33	208	211	61	87
Chardonnay	34	235	231	92	152
Chardonnay	36	147	153	103	82
Chardonnay	5	191	208	197	192
Chardonnay	3	86	76	89	88
Chardonnay	4	196	193	193	178
Chardonnay	507	216	218	159	197
Sauvignon Blanc	6	127	127	-	-
Chardonnay	3	139	140	130	133
Sauvignon Blanc	508	118	119	122	146
	Mean —	166	168	127	139

$NH4^+$ - converted to NH_3 with NaOH, read with Orion 95-10-00 special ion electrode
FAN - spectrophometric determination, with ninhydrin

1) Rack and settle 1 or 5 gallons of juice from the drain and press tank, immediately after completion of pressing.

2) That night, rack clear juice out of the above container to 375ml bottles for bentonite fining trials: 0-4 lbs/1,000 gal for most varieties, 3-6 lbs/1,000 gal for Sauvignon Blanc, Gewurztraminer and Muscat. Settle in a refrigerator overnight.

3) The following morning, syringe-filter (prefilter + 0.65*u*) 5ml of each bottle into 10ml disposable test tubes. Let samples come to room temperature.

4) Add 0.5ml Bentotest to each test tube, invert to mix, wait 1-10 minutes.

5) Examine turbidity with high intensity light; look for the bentonite level at which turbidity decreases. Select a fining level 25% less than indicated. This is a rough empirical rule which takes into consideration the broad spectrum protein denaturation of the reagent.

Undoubtedly, other methods could be used instead, including Coomassie blue protein dye-binding reagent, and proteim precipitation or denaturation by such reagents as tannin, ethanol, or ammonium sulfate.

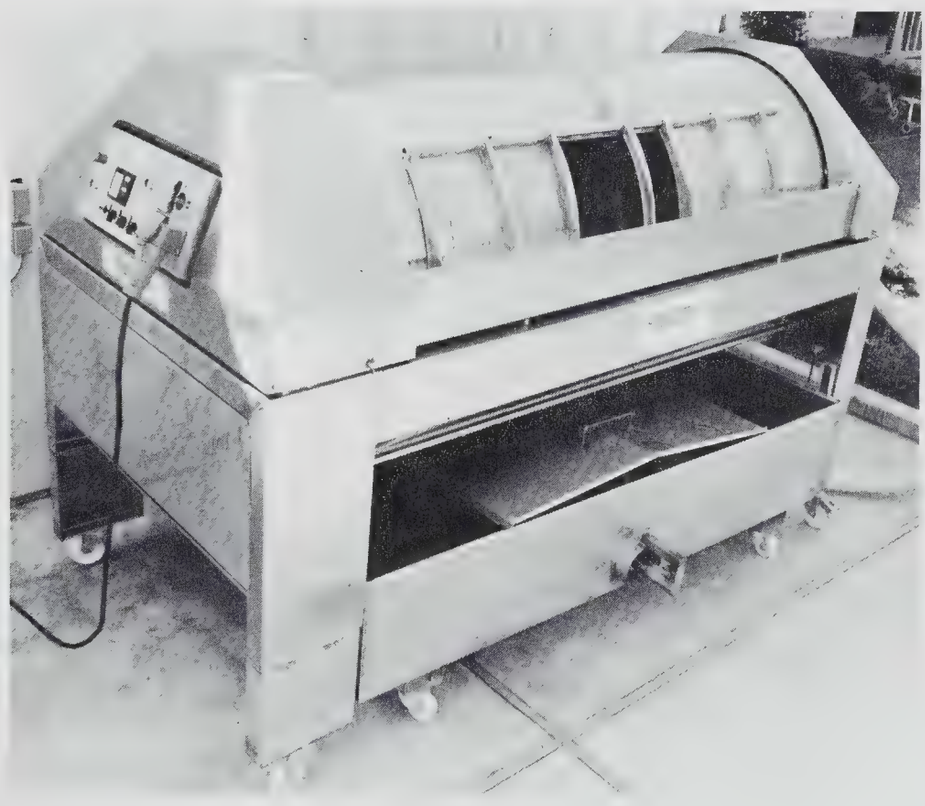
Smaller wineries which do not have the analytical support to handle the above laboratory sequence might try standard levels of bentonite, depending on grape variety. These levels, based on past experience, might be 4-5 lbs/1,000 gal for Sauvignon Blanc, Gewurztraminer and Muscat, and 2-3 lbs/1,000 gal for Chardonnay, Chenin Blanc and rosés. Within several years of working with the same vineyards, a winery should have a pretty good idea of the bentonite requirement of grapes from each vineyard.

Juice fining is most likely not the long-term solution to protein instability. That solution may lie in specific proteases or some other method not yet developed. Until then juice fining does seem to be an option that can be readily used and is available to all winemakers.

Fischer & Schug Winery Equipment

Membrane Presses

1200, 1800, 2600, 3600, 5200 liter



All stainless steel 2600 PLE with auger-pan.

Sales, Parts & Service
940 Dowdell Lane
P.O. Box 556
St. Helena, CA 94574
(707) 963-7000

Méthode Champenoise

Bruce Zoecklein

A market survey conducted several years ago in Britain asked people what the word champagne suggested to them. Few answered sparkling wine. The responses were mostly associated with abstract concepts such as pleasure, festivity, luxury, success, love, etc., (Duijker 1980). These popular images coupled with the logical extension of the white wine boom are perhaps the main reasons for the rapid growth in sparkling wine interest and consumption.

Centuries of experience have enabled the sparkling wine producer to refine the art of bottle fermentation to a system known as methode champenoise. This system of production is certainly not rigidly defined; certain steps are prescribed by law in France—very few in America. Within specified guidelines there is a considerable variation in the production philosophy and techniques employed in methode champenoise. This begins a series relating the principles and practices of methode champenoise.

Viticultural Considerations

There are currently 118 wineries in 20 different states producing sparkling wine by *methode champenoise.* This represents an extreme diversity in climate, vineyard management practices and possibly production activity. We conducted the first of several survey designs to learn the practices and concerns of producers. Sixteen North American sparkling wine houses (11 Californian) were polled. The results of these industry surveys will be reported in this and subsequent articles.

Smart (1983) developed a model interrelating a multitude of viticultural parameters to fruit composition. (see chart) It is difficult and may indeed be wrong to attempt to isolate the influence of individual factors on quality because of the strong interraction between each of them.

However, for the *methode champenoise* producer, understanding the relationships between vineyard management and ultimate wine quality may be even more difficult than for table wines. Cuvees are evaluated and blended when they have the better part of their life ahead to age and develop. This requires considerable insight and perhaps helps to obscure the relationships between vineyard management activities and ultimate sparkling wine palatability.

According to Schopfer (1981) the goal of the *methode champenoise* producer is to make a cuvee with the following general attributes:

Low alcohol Vol.%11.85+/-.47	Low V.A.
High titratable acidity	Low aldehyde content
High malic acid content	Low metal content.
Low pH (under 3.2)	Extract of +/-25g/l
Low flavonoid phenol content	

Often one is looking for a base wine that is clean (free from enological flaws), delicate, somewhat neutral with respect to varietal aroma and aroma intensity, not heavy or assertive. A cuvee is sought which has body, structure and substances, yet is not dull or lifeless. There are certainly stylistic freedoms that would alter the above generalities. Both viticultural and enological activities can be employed to help reach the desired goal. Certainly, one of the major challenges of the 80's is to gain a greater insight into viticultural winemaking for both table wines and *methode champenoise.*

There is very little doubt about the importance of climate not only on the vigor of the vine, but also on the character of the resulting wines. Climatologists recognize three levels of climate. Macroclimate is the climate of a particular region. Mesoclimate differs from the regional or macroclimate due to variations in altitude, topography, distance from the river, etc. Microclimate is, of course, the climate within and around the grapevine canopy. This is the climate modification caused by the plant cover being present. In the sense that the characteristics of the canopy will affect microclimate, it is under the control of the viticulturist.

With the exception of the Mosel region of Germany, the Champagne region is the most northerly significant grape producing macroclimate in the world. Epernay is on the 49° parallel, the same as the Washington/Canadian border.

The total degree days in Champagne average around 1890, as compared to 2,340-2,610 for Napa and 2,160-3,600 for Sonoma County. The daytime temperatures seen in Napa, for example, are higher with cooler nighttime temperatures than in the Champagne region. As a result of increased solar radiation, grapes tend to ripen more quickly and potentially reach a higher level of maturity in Napa than in the Champagne region. This is true for most other regions in California as well.

For example, the same grape variety which could easily reach 21-24° Brix in Napa may be lucky to reach 19° Brix in Epernay. The result of this is that certain varieties in California, notably Chardonnay, can produce base wines which have more aroma and body than their European counterparts in Champagne. As such, care must be used in selecting harvest parameters which minimize excessive or assertive varietal character.

In Champagne, vines are grown on chalky soil with hard rocky subsoils. High density plantings are trained on low cordons so that light reflected from the chalky soil can modify the canopy microclimate and help mature the crop. Thus the soil in the Champagne region helps to modify and influence climate and vine performance. It is obvious that low-trained vines in northerly climates profit more from this microclimate than taller vines. In warmer regions the height of the vine off the vineyard floor is used to minimize this heating affect.

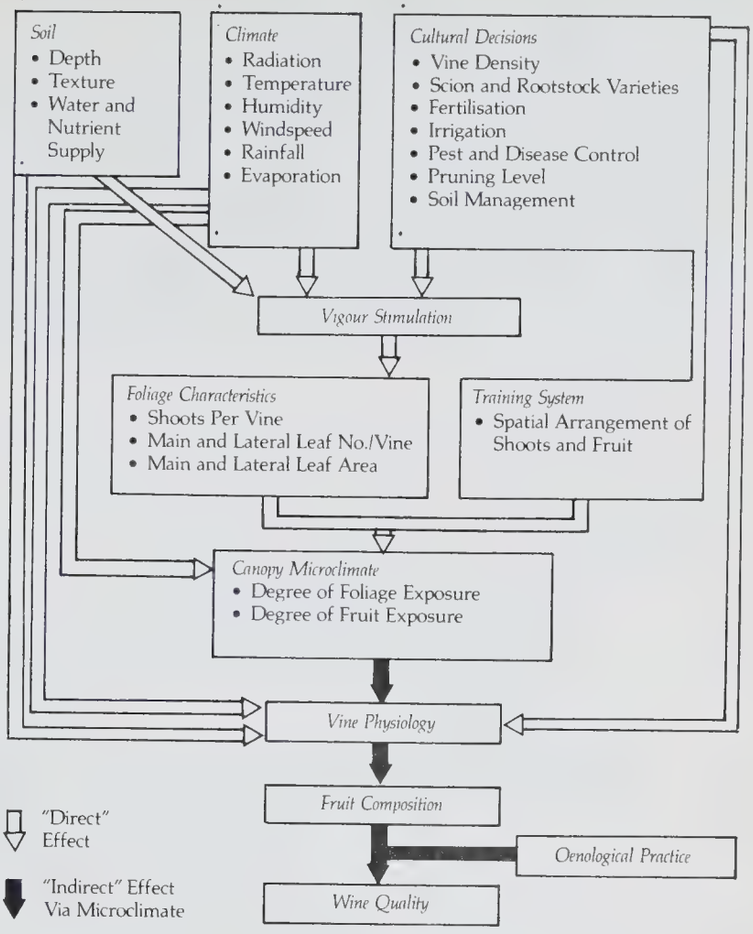
As expected, our survey showed an extremely wide range

of soils planted in 'Champagne' grapes. In general it was noted that deep, fertile soils were avoided. Such soils store large amounts of water that with an abundance of nutrients can result in excess vine vigor. With the exception of climatic influences, most American researchers regard soil as having a rather insignificant or very indirect effect on ultimate wine quality, except when growth limiting factors such as high clay content, shallowness, poor drainage, or high concentration of salts or other toxic substances are present.

Spacing in California, both between rows and between vines, is looked at largely as a means of providing access for cultivation and harvesting. Common practice is to use 12 feet between rows and 6 to 8 feet between plants. For Chardonnay, the closest planting distance reviewed by our survey was 6 X 10 reported by 2 houses. The balance of those responding were planting at 8 X 10 and 8 X 12 on a two-wire trellis. The decision on planting density must be made with a link to the trellis system employed, soil fertility, available water, etc. Experience has shown that vines in the Champagne region produce the best results when planted fairly close together. Pinot Noir vines are spaced about 1 meter apart, while the slightly more vigorous Chardonnay is planted slightly further apart. This results in 3,200-4,000 plants per acre as compared with about 700 plants per acre. This was the highest density reported in our survey.

When the planting density increases or decreases the root system, respective overhead volume may develop to a greater or lesser extent. The composition of neighboring vines then becomes more or less intense and the growth potential is also parallelly affected. The increased planting density causes a decrease in the root system per vine and leads to a decrease in the grape production per vine. One wonders if the root system and system development should not be receiving the same scrutiny as canopy management.

It is generally accepted that a cool macroclimate which allows the fruit to stay on the vine longer while retaining desirable acidities, is important in the production of base wines which will develop the needed complexity during ageing *sur lies*. The search for cool mesoclimates explains the interest in the Russian River region of California, which is reported to have



areas with heat summation units as low as 1,800 (Hutchison 1984).

If the field temperatures and heat summation units were the sole determination of the grapevine climate, then we

Tonnellerie Française
FRENCH COOPERAGE OF AMERICA

MANUFACTURER OF
AMERICAN OAK BARRELS
IN OLDEST FRENCH TRADITION
IMPORTED FRENCH GLASS AVAILABLE

DUANE H. WALL
JEAN-JACQUES NADALIE
MAITRE TONNELIER

(707) 942-9301
1401 Tubbs Lane (P.O. Box 798) Calistoga 94515
distributor of
TONNELLERIE LUDONNAISE
(707) 942-6127

SEE US AT A.S.E.V. BOOTH 70

COMPUTER SYSTEMS TO HELP YOU PRODUCE QUALITY WINE AT MANAGEABLE COST

NOW WITH TWO INTEGRATED IBM PC SYSTEMS

WINERY INFORMATION MANAGEMENT SYSTEM
Case Goods Inventory, Order Entry and Invoicing, Sales Analysis, Payables, Receivables, and General Ledger.

WINERY PRODUCTION MANAGEMENT SYSTEM
Crush, Blend, Percent Composition and History, Tank Ingredients, Wine Chemistry, Barrel, Cost Analysis, Grower Contracts, and Government Forms.

DATA CONSULTING ASSOCIATES
18000 COLEMAN VALLEY ROAD, OCCIDENTAL, CA 95465
707-874-3067

SEE US AT A.S.E.V. BOOTH 165

need only consider macroclimate variables in analyzing the temperature effects on quality. The real situation, of course, is not that simple. Solar radiation, wind velocity, and to a lesser extent, sky temperature can give ranges of berry temperatures of more than 15°C above to 3° below the air temperature (Kliever and Lider 1968). Such changes are affected by row orientation, training system, trellis height, vine vigor, etc.

To most *methode champenoise* producers, a high malic acid level in the grape is considered a desirable if not required characteristic. Malic acid makes up 43 - 47% of the titratable acidity of most cuvees in the Champagne district (Schopfer 1981). Malic acid is believed to add life and freshness to sparkling wine bases. The malic acid level in the fruit is principally influenced by temperature. Lekso and Kliever (1975) have shown significant changes in the activity of PEP carboxylase and malic enzyme when grapes are exposed to high temperature for short times.

Short term exposure to high temperatures is significant to fruit malic acid levels to say nothing of the effects on phenols, aroma components, etc. The effect of brief exposure to high temperature may raise serious doubts about how one integrates—over time—climatic parameters to fruit composition.

We asked in our survey if during the growing season, or at the time of harvest, which if any, of the following parameters were measured: canopy density, canopy gaps, extent of fruit shading, shoot length, lateral shoot length, mean leaf size, cluster weights or berry weights. This is an attempt to relate the vintage with certain measurable viticultural parameters (Smart *et.al.*, 1981). The concept of quality of the vintage is somewhat vague and complex since it must fulfill a varying set of analytical and sensory factors.

Of the 16 houses which responded, 4 stated that attempts were made to actually measure cluster weights and berry weights. Nine of the 16 houses said that although no actual measurements were being taken, some or all of these parameters were being watched. There was particular emphasis placed on fruit exposure, regardless of the fact that berry temperatures were not being monitored. Two producers reported that excessive vigor was a problem and that hedging was used to help solve the problem. An excess of shaded unproductive inner leaves raises fruit potassium, lowers titratable acidity and can result in higher relative humidity and lower wind velocity through the canopy. The latter two factors, of course, can have a significant effect on fungal growth. Four houses indicated that they intended to measure specific viticultural parameters in the future. Cultural treatments which alter fruit exposure such as pruning, training, trellising, etc., may indeed affect fruit composition due to effects on microclimate. It appears from our survey that there are limited measurements of the effect of cultural treatment on microclimate.

The pronounced effect of climate on wine character, especially in cooler wine regions of Europe, has led to distinct

SCHOLLE

#1 IN BAG-IN-BOX PACKAGING FOR THE WINE INDUSTRY

- *First to Introduce Bag-In-Box For Wine*
- *First to Develop and Use Metalized Films in Bag-In-Box for Wine*
- *First to Design and Develop High Speed Webbed Bag Filling Equipment*

And the Research Continues

THE LATEST SCHOLLE INNOVATION IS LO-OX® FILM WITH *VIRTUALLY ZERO OXYGEN PERMEATION.*

CALL OR WRITE TO US FOR DETAILS

SCHOLLE CORPORATION

19500 JAMBOREE BLVD.
IRVINE, CALIFORNIA 92715

TELEPHONE: 714/955-1750 TELEX: 692 455

15 PLANT LOCATIONS WORLDWIDE

See us at the ASE show—Booths 62-63

Wine East

The lively magazine that keeps you up-to-date on the news of grapes and wine in Eastern North America.

With 325 wineries located between the Rocky Mountains and the Atlantic Coast, wine professionals and consumers are discovering the importance of keeping informed about this rapidly expanding wine region. Published bi-monthly, *Wine East* contains winery profiles, in-depth features on Eastern grapes, wine and winemaking, and human interest stories centering around Eastern wine people.

Subscription rate: $10.00 for one year ($15.00 in Canada and overseas, payable in U.S. funds)

Write for a free sample and/or a list of other publications available about the Eastern wine industry.

L & H Photojournalism
620 North Pine Street
Lancaster, PA 17603

Eastern Wine Publications

viticultural and enological patterns that have evolved largely according to experience. Thus early ripening Pinot Noir is grown in Champagne and Burgundy to evade the cold autumn climate. Champagne, Burgundy, Alsace, etc., depend upon well-drained slopes to encourage high soil temperatures, thus affecting the grapevine climate.

It appears that many European viticultural practices associated with higher quality in Champagne and elsewhere may be explained with reference to microclimate. More to follow.

References

Duijker, H., *The Wines of the Loire, Alsace and Champagne,* Crescent Books.

Hutchison, J.H., *Cool Sonoma Sparkles,* Wines and Vines, Dec. 1984, pp.24-27.

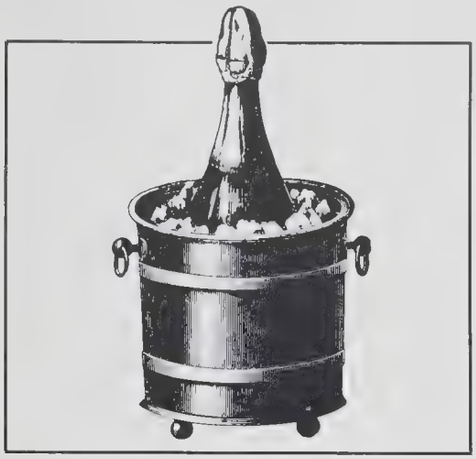
Kleiver, W.M. and L.A. Lider, *Influence of cluster exposure to the sun on the compostion of Thompson Seedless Fruit,* Amer.J.Enol.Viticult., 1968, 19:175-184.

Lasko, A.N. and W.M. Kliever, *Temperature and Malic acid grape enzymes,* Pl. Physiol. 1975, 56:370-372.

Schopfer, J.F., *Oenologie et technologie preparation des vins de base de qualite,* Simposio internazionale vini spumanti, Instituto de Enologia-Piacenza, 1981.

Smart, R.E., *Advances in Viticulture and Enology for Economic Gain,* Proceedings of the Fifth Australian Wine Industry Conference, 1983, The Australian Wine Research Institutes.

Smart, R.E., J.B. Robinson, and G.R. Due, *Manipulation of Wine Quality with the Vineyard,* Proceedings of the 1981 Australian Wine Industry Conference.

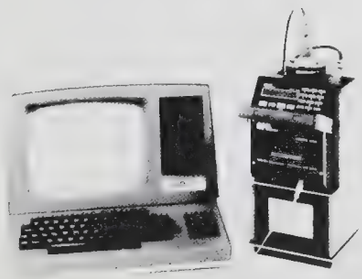


IRRIGATION WATER MANAGEMENT

Knowing..... • WHEN TO IRRIGATE
• HOW MUCH TO IRRIGATE

Means.... • BETTER CROP YIELD
• LESS COST

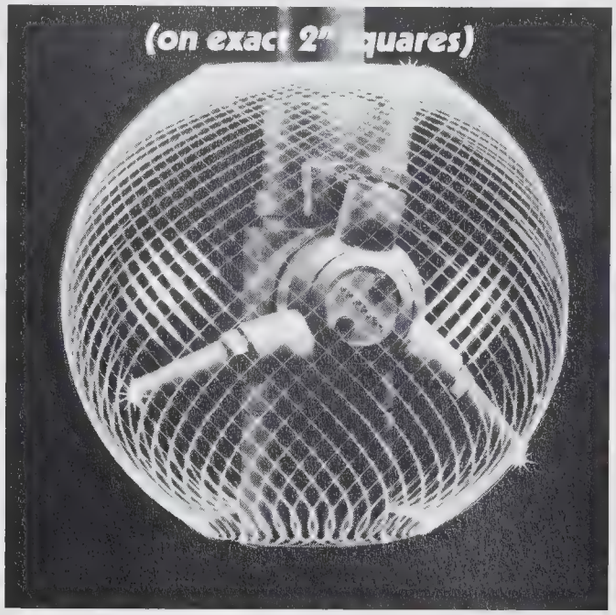
CPN Model 503 DR
HYDROPROBE
Fast, accurate readout of sub-surface moisture. Available with storage and computer output.



CPN CORP.
130 S.Buchanan Circle
Pacheco, Cal 94553 USA
415-687-6472
Telex 17-1289

SEE US AT A.S.E.V. BOOTH 42

This proves how precisely Gamajet® machines clean tanks.



But that's only 1 of 3 major Gamajet advantages!

The unretouched photograph shows that Gamajet's liquid streams clean every portion of tank surface with synchronized 360° precision. What it can't show is their efficient non-feathering jet scouring action at distances of 15, 20, even 25 feet! And it can only hint at the rugged design of a machine built from the highest quality materials to give workhorse performance 16-24 hours a day, 7 days a week.

Then consider Gamajet's ability to use high pressures of 200 psi or more for faster cleaning cycles that save chemicals and waste disposal costs every time. Or, its more powerful jet streams that often permit a tank wash with water alone. Finally, with its complete flexibility (fast, easy, on-site interchangeability of dual or triple washing heads, nozzles and turbines)—it's one machine that will handle any tank cleaning job you'll ever face.

Of course Gamajet quality costs a little more—initially. But not when bottom lines are compared 12 months later with maintenance labor, spare parts and downtime included.

Efficiency. Dependability. Economy. We can prove it. Please call us.

SYBRON | Gamlen

GAMAJET EQUIPMENT DIVISION, SYBRON CHEMICALS INC.
121 South Maple Ave. • Phone (415) 873-1750 • South San Francisco, CA 94080

Determining Fine Wine Characteristics

Scott Clemens

(Editor's note: Thirty years ago, wine researchers were touting the potential of the gas chromatograph to replace the winemaker's 'nose' in evaluating wine flavor and quality. I am not aware of a single winery yet using a gas chromatograph to make all its winemaking decisions. The high performance liquid chromatograph has the potential to identify specific phenolic compounds, organic acids, amino acids, etc. But it cannot analyze aroma compounds as well as a gas chromatograph. Neither instrument can replace a winemaker's sensory support work to make progress on wine quality, but they are providing exciting information that guides our subjective judgements.

This story looks at phenolic compounds, one of the many important compounds in secondary chemistry.)

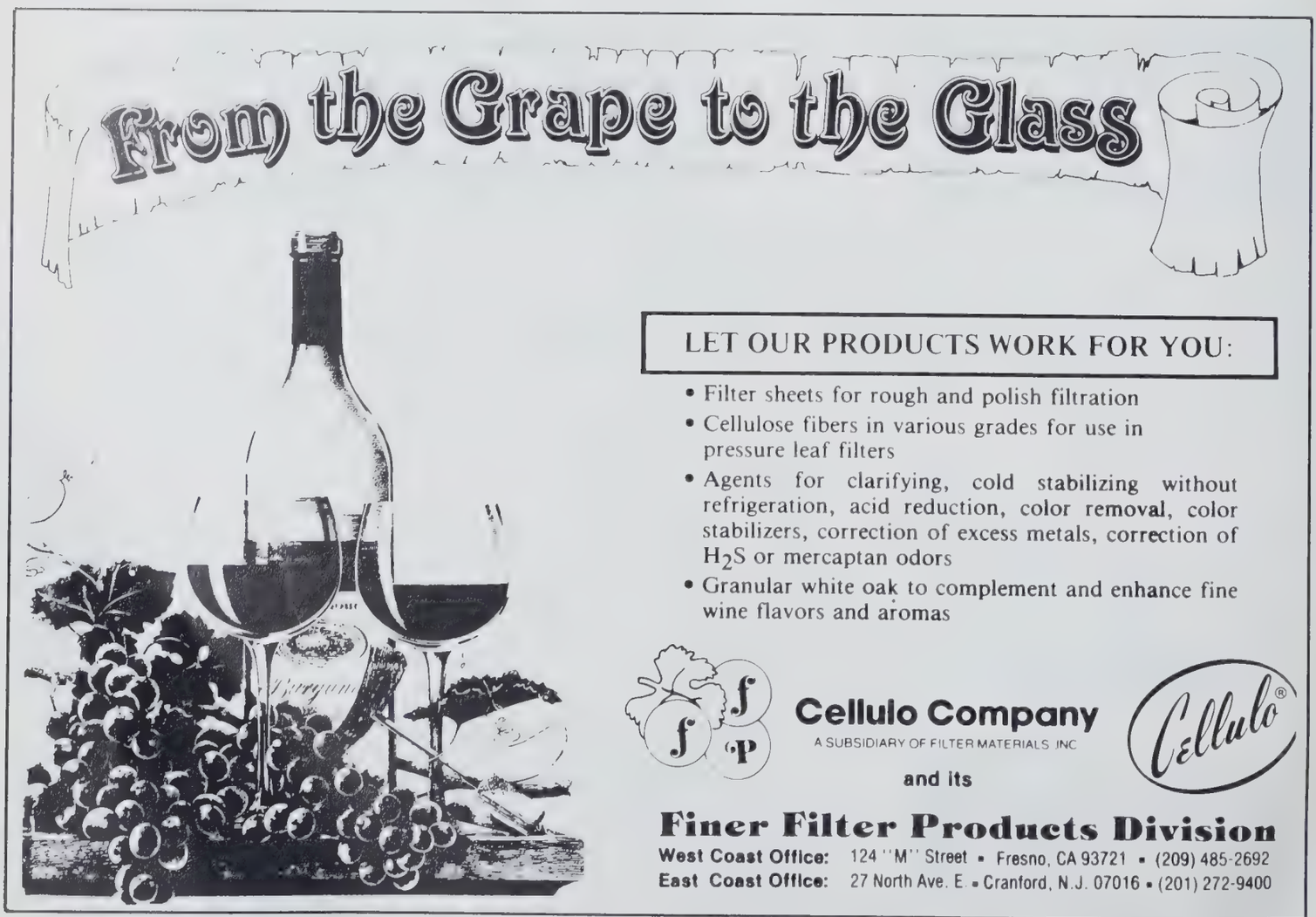
Most of us like to think of winemaking as a traditional occupation employing traditional methods and not laboratory craftsmen. To a certain extent that impression holds true. But like everything else, winemaking has ridden on the back of certain technologies, beginning perhaps when the barrel replaced the amphora as a storage vessel, and taking another quantum leap with the 17th century discovery of cork as the ideal stopper for glass bottles.

Later, in the 1860's, Louis Pasteur uncovered the role that oxygen plays in both spoilage and ageing, and in the 1870's he unraveled the mystery of fermentation. Certainly wonderful wine had been made without this knowledge, but Pasteur's explanation helped winemakers to understand and control fermentation in ways that had been impossible before.

Where winemakers in the last century left almost everything about fermentation to chance, today's winemakers and vineyardists rely on chemical analyses of sugar, acid, and alcohol, and on modern technological tools to consistently produce clean, drinkable wines, and to increase the possibility of producing great wines.

Pasteur opened the doors of wine science to fermentation and its chemical changes. The ability to accurately analyse the chemicals in wine has, until relatively recently, been limited to Pasteur's 'fermentation' chemistry or primary chemistry. However, valuable components in red wine are secondary chemicals about which we know little.

A distinction between primary chemistry and secondary chemistry is commonly made by non-wine researchers that


From the Grape to the Glass
LET OUR PRODUCTS WORK FOR YOU:
• Filter sheets for rough and polish filtration
• Cellulose fibers in various grades for use in pressure leaf filters
• Agents for clarifying, cold stabilizing without refrigeration, acid reduction, color removal, color stabilizers, correction of excess metals, correction of H_2S or mercaptan odors
• Granular white oak to complement and enhance fine wine flavors and aromas
Cellulo Company
A SUBSIDIARY OF FILTER MATERIALS INC
and its
Finer Filter Products Division
West Coast Office: 124 "M" Street • Fresno, CA 93721 • (209) 485-2692
East Coast Office: 27 North Ave. E. • Cranford, N.J. 07016 • (201) 272-9400
Cellulo®

SEE US AT A.S.E.V. BOOTHS 157-159

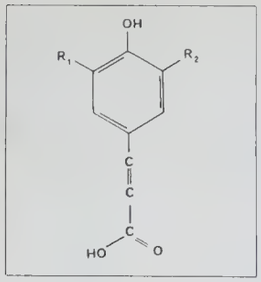


Figure 1

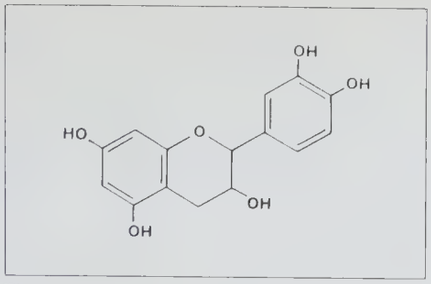


Figure 2

work on natural product chemistry. They use various analytical tools including High Performance Liquid Chromatography, Nuclear Magnetic Resonance, and Mass Spectrometers. By bringing techniques of secondary chemistry to grapes it is possible to explore the traditional flavors (but not odors) in wine.

Ridge Vineyards in the Santa Cruz Mountains CA, has attempted to distinguish between primary and secondary taste chemicals by seriously investigating phenolic flavor compounds using HPLC, NMR, and Mass Spectrometers. Why study phenolic flavors?

Paul Draper, winemaker, and Dr. Leo McCloskey, biochemist, believe that the flavor phenolics in great wine are flavonoids. They want to preserve traditional French winemaking techniques and by demonstrating how traditional methods cause major changes in red wine, they may be able to explain fine wine.

McCloskey has been intrigued by Australian T.C. Somers' 1974 theory that there is a relationship between red wine phenolics and wine quality. Draper has commented, "All wine has about the same balance of sugar, acid and alcohol (primary chemistry). Whatever distinguishes a great wine from a mediocre wine might be found in a wine's secondary chemistry."

One group of secondary chemicals are phenolic compounds; organic chemicals made of six double-bonded carbon atoms in a ring with hydroxyl groups (similar to sugar except for the double-bonding). All grapes contain simple phenates (-salt form of the phenolic acids) and they are present in both white and red wines. Oddly enough, phenols have no known

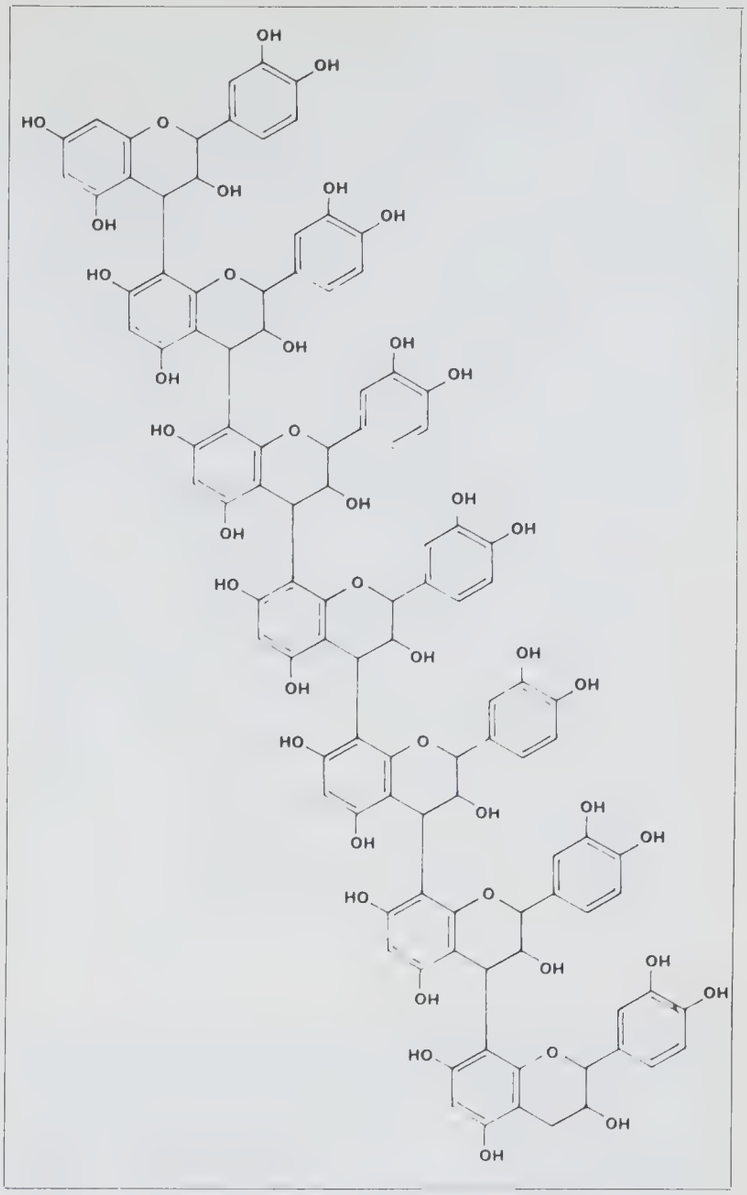
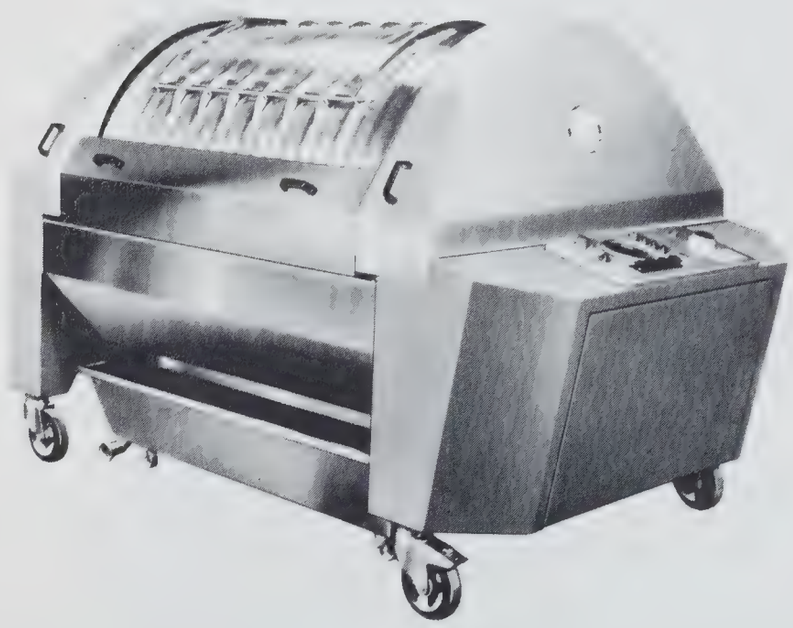


Figure 3

THE NEXT GENERATION OF BLADDER PRESS!!

- State of the Art German Engineering
- Star mounted Bladder
- 360° Drainage Surface for 1/3 faster pressing cycles
- Built-in Compressor and Vacuum Fan
- Sizes from 8-240 hectaliters
- U.S. compatible motors, 220V, 3ϕ, 60 HZ



Exclusively from
WINE AND THE PEOPLE, INC.
948 Third Street
Napa, California 94559
(415) 549-1286

SEE US AT A.S.E.V. BOOTH 100

physiological function in plants; this categorizes them as secondary chemicals. Fig.1 shows a typical simple phenolic, specifically, a cinnomic acid.

In addition, red wines contain a specific subclass of phenols called flavonoids, a large class of phenols with three rings in one molecule. Fig.2 shows a common flavonoid in wine; a catechin. Fig.3 is a related flavonoid, tannin. Flavonoids (the group to which wine tannins belong) account for 70-80% of the phenolic composition of a red wine like Cabernet Sauvignon. Flavonoid compounds, themselves, are present at levels of about 2,000-4,000 ppm in Cabernet.

Wine is considered to be more complex and interesting than grape juice, but wine's complexity cannot merely be accounted for by the presence of alcohol or primary chemicals from fermentation. During fermentation, both alcohol and heat extract from the grape skin: red pigments, tannins, and such flavonoids as catechins which are almost non-existent in grape juice but play an important part in the improvement of fine wine during the barrel and bottle ageing cycles.

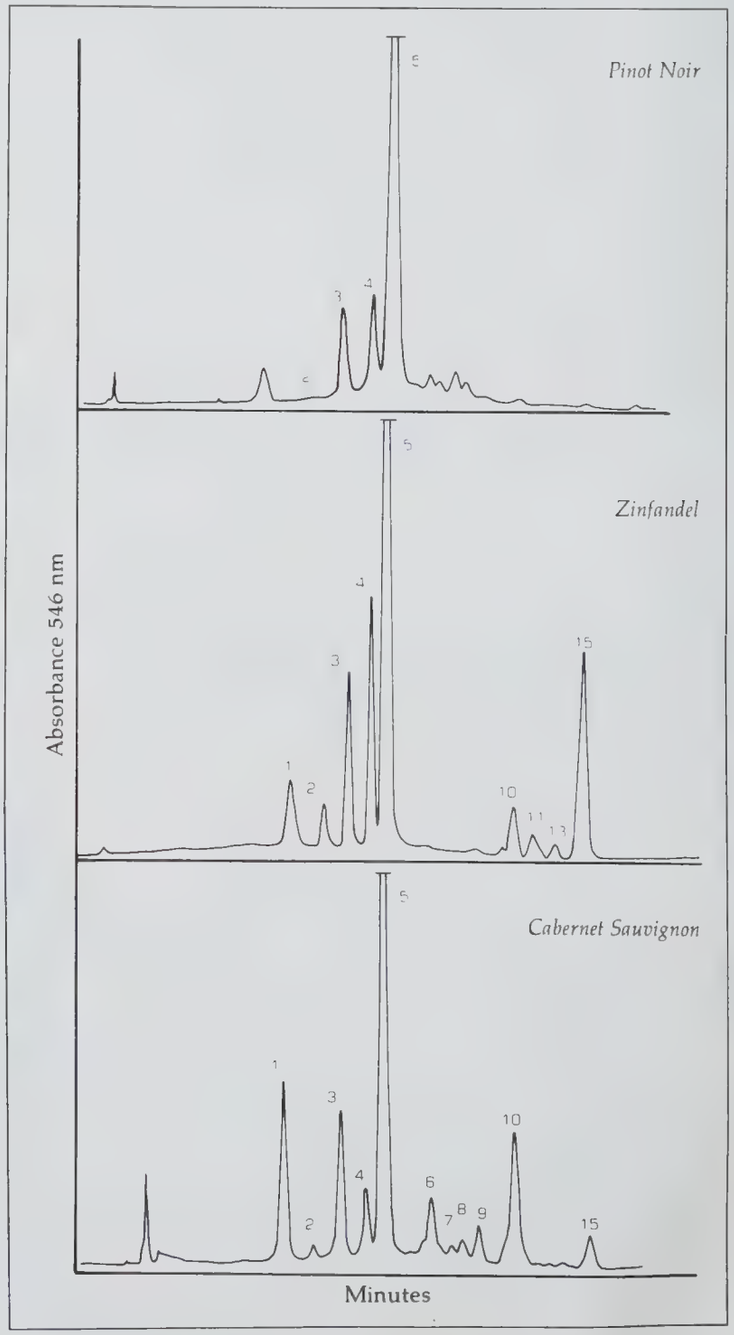
Previous to Ridge's investigation, phenolic pigments were studied by European chemists and Nobel laureates in the last 75 years. Most of this work has been done outside the wine industry. The first systematic study of wine and oak tannins was carried out in the 1920's and 1930's by non-wine chemists such as O. Rosenheim, K. Freudenberg and O. and R. Robinson who received a Nobel prize. About 1970, tannin chemistry was further clarified by K. Weinges, E. Haslam and H. Porter, all Europeans. Between 1962-1975, Englishmen E. Bate-Smith and J. Harborne used paper chromatography to show which phenols were in over 1,000 plant species.

Although the field expanded, any winemaker using paper chromatography to measure the conversion of malic to lactic acid will appreciate the primitive nature of flavor technology at that time. Only later did wine chemists such as T.C. Somers, A.D. Webb, and P. Riberau-Gayon work on elucidating phenolic compounds in wine. At UC Davis, V.L. Singleton quantified wine phenates and mapped the location of phenols within grapes.

Inadequate analytical tools limited wine research until the advent of HPLC in the mid-1970's. For those not acquainted with HPLC, a sample of wine is pumped at 6,000 lbs pressure through a pin-hole sized tube, effectively separating the wine into a single-file line of molecules. The sample passes through at very high speed and pumps across a column filled with minute coated silica beads to which all of the components adhere. Addition of organic solvents (like methanol) wash specific compounds off of the silica beads.

The compounds can then be collected, freeze-dried, and chemically identified using both a NMR computer and a Mass Spectrometer. Each compound is recorded on a graph as it is stripped off the column of the HPLC. The graph, which McCloskey calls a 'fingerprint' is unique to each wine and also to each varietal; Petite Sirah, for example, has eight

Figure 4



TANK MONITORS*

LIQUID LEVEL • TEMPERATURE

SYSTEMS & CONTROLS

Our no moving parts, totally electronic systems have been designed, and proven to be the most reliable, and most accurate in the industry.

NEW MICRO-COMPUTER SYSTEM NOW AVAILABLE

*Experts in the wine industry since 1970

expo Instruments, Inc.

electronic liquid level and temperature measurements

183-D Commercial Avenue • Sunnyvale,Ca 94086

Telephone (408) 245-8822

more pigments than Pinot Noir. Certain pigments will be more or less concentrated in one variety than in another. (see Fig.4)

Ridge began its phenolic HPLC-NMR study in 1979 in conjunction with McCloskey's consulting firm, Santa Cruz Agricultural Chemistry. He was particularly interested in studying phenols as they relate to wine ageing. Working with J.H. Langenheim and K.V. Thimann of UC Santa Cruz and T. Swain of Boston, McCloskey focused on HPLC and acquired more information on flavonoids and tannins in other plants, as well as studying red pigments in wine as it aged. Ridge supplied the HPLC, wines from the winery's library, as well as the expertise and aesthetic perception of winemaker Draper.

McCloskey's studies have focused on the ageing process in premium red wines. Fingerprinting 1970 through 1979 Ridge Zinfandels from Geyserville and Cabernet Sauvignons from the Montebello Ranch, SCAC tracked nine anthocyanins (red flavonoid pigments) and found that they diminished and finally disappeared by the five-year mark, changing into other compounds. Thus, unlike sugar/acid/alcohol, anthocyanins are ageing.

The next step was to investigate the colorless flavonoids (which includes tannins and 'bitters'). There are some 3,000 reported flavonoids in plants and researchers have speculated that wine contains over 400 phenols. McCloskey is confident that there are far fewer.

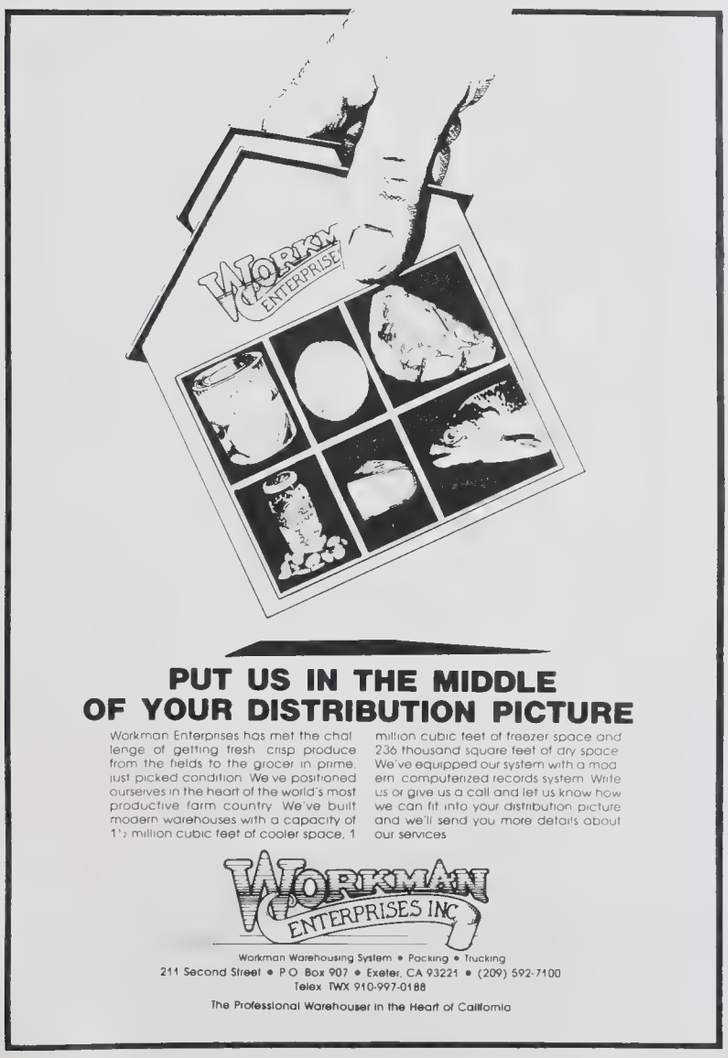
"From my viewpoint, there are a lot of misrepresented compounds," he says, "pointing out that the past technology is not 100% effective and that it is necessary to test compounds using more than one modern technique in order to verify a particular compound's identity." Almost all flavonoids are found in the grape skins and they are ten times more abundant and more important in red wine; the classic flavonoid being tannin.

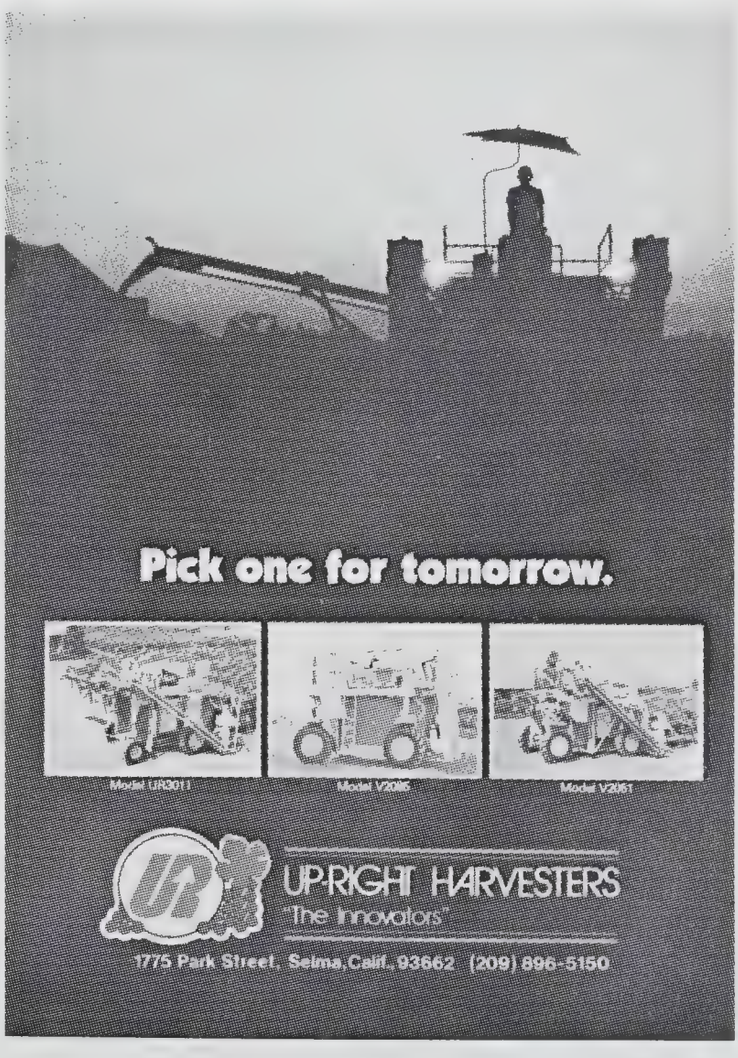
In 1983, McCloskey, in association with S.P. Arrhenius, succeeded in separating out eight colorless flavonoids. They are now following these through the ageing process in the 1983 Ridge Reserve Cabernet. SCAC found that some remained the same, some diminished and one even increased. "You could accept two theories," says McCloskey, "either they're precipitating out or they're turning into something else."

Apart from the ageing studies, McCloskey has used HPLC to quantitatively measure what is stripped from a wine during fining and filtering while Draper gives his qualitative assessment at each step. Obviously the winemaker's intuition is important, but it may be that sometime in the future one may be able to shoot for a specific quantitative measurement based on past results, just as winemakers today shoot for certain sugar or acid levels when deciding when to harvest.

Other quantitative/qualitative assessments should be possible. As Draper enthusiastically declares, "One great thing about having a tool that can distinguish between grape tannin and oak tannin is that you could actually see when a wine is over-oaked."

The winemaker's palate and market trends will always set the style, but new technologies should make it easier for a winemaker to objectively evaluate must and wine and to achieve set parameters more closely than would be possible solely by hedonistic standards. After all, even the most expe-


WORKMAN ENTERPRISES
PUT US IN THE MIDDLE
OF YOUR DISTRIBUTION PICTURE
Workman Enterprises has met the challenge of getting fresh, crisp produce from the fields to the grocer in prime, just picked condition. We've positioned ourselves in the heart of the world's most productive farm country. We've built modern warehouses with a capacity of 1½ million cubic feet of cooler space, 1 million cubic feet of freezer space and 236 thousand square feet of dry space. We've equipped our system with a modern computerized records system. Write us or give us a call and let us know how we can fit into your distribution picture and we'll send you more details about our services.
WORKMAN ENTERPRISES INC
Workman Warehousing System • Packing • Trucking
211 Second Street • P.O. Box 907 • Exeter, CA 93221 • (209) 592-7100
Telex TWX 910-997-0188
The Professional Warehouser in the Heart of California



rienced tasters have off-days, but programmed machines don't have off-days; they're totally objective.

Though the studies are still in their infancy, it is hoped that the knowledge gained may eventually answer some basic questions about how one wine ages into a masterpiece while another falls apart. Then it may be possible to predict which wines will age and which won't and alter the style of the wine accordingly.

Overall results of all of the Ridge studies seem to confirm T.C. Somers' 1974 theory that there is a connection between red flavonoid compounds and quality. That great wines have more of certain phenolic compounds than lesser wines can be shown by the McCloskey-Yengoyan fingerprints.

"Stability is a component of a fine red wine," notes McCloskey, "it keeps it's valuable red color for a longer period. In mediocre wines, the red pigments break apart and over time, they yellow and finally become colorless."

I spent an evening with Draper and McCloskey fingerprinting and tasting several 'stable' fine wines. Fingerprinting a 1964 Cheval Blanc and a 1971 Ridge Montebello Cabernet Sauvignon, McCloskey was able to predict some of the characteristics of the wines and based on the fingerprints, he correctly singled out the wines when tasted blind.

McCloskey was right-on-target regarding the almost sweet character of the fruit which he ascribed to the presence of a compound called oenotannin. Remarkably, both wines were very similar in both fingerprint and taste, even though the Cheval Blanc is a blend of Cabernet Franc, Merlot, and Malbec. These varieties are chemically very similar.

A discussion ensued about fined and unfined/unfiltered wines and their respective ageing potentials, and the consensus of opinion was that excessively fined wines (*e.g.* multiple finings at high levels) may last a very long time, but they will not develop the complexity and nuances of age.

An understanding of the relationship between the quantitative and qualitative aspects of phenolic combinations may be invaluable information. How much can one clean up and stabilize a wine before it falls apart? One of the intriguing mysteries on which HPLC might eventually shed light is why aged Zinfandel and aged Cabernet Sauvignon are often so difficult to tell apart. Whatever the question, flavor chemistry is being probed with an assortment of new analytical techniques being developed by McCloskey's SCAC and Ridge Vineyards.

Currently SCAC has focused Ridge Vineyards' research specifically at premium Cabernets and Zinfandels and McCloskey's own Felton-Empire is investigating Pinot Noir. IN 1983, Ridge and Felton-Empire started a study of the effects of various cellar practices on the phenolic HPLC 'fingerprints' of their red wines. With the 1984 vintage, Ridge has researched the extraction of flavonoids during fermentation, ripening and cellaring.

"We do not want to understand only chemicals," says McCloskey, "rather, we want to understand the viticulture and the winemaking of great wines. Our research is relatively hedonistic. Our standards are enjoyable wines—great wines if you will. Ridge and Felton-Empire took this approach because the word phenolic can have little practical meaning if it is not put into the context of a particular wine, namely fine wine.

"Although it is poignant to note that great red wines have great tanniferous chemistry, if we did not take the hedonistic standard into consideration, winemakers could not justifiably feel that phenolic chemistry relates to good wine. I personally feel the raison d'etre of fine red wine is a function of secondary chemical changes in the vineyard and winery. In a sense, you could say we may be looking at the economically valuable compounds in great red wines of the world."

If it is possible to fingerprint the difference between mediocre grapes and great grapes, it may one day be possible to manipulate the soil and vineyard practices to improve the grapes. If it is possible to fingerprint the difference between a mediocre wine and a great wine, it may one day be possible to qualitatively measure and thus change winery practices to improve the wine.

Ridge and SCAC have opened the door a crack using high-tech tools that winemakers of the future might think of as commonplace. If their example can induce other wineries to experiment with new technologies, the future may not be so very far away and it could prove that traditional techniques produce compounds, such as oenotannins, that are the basis of great wines.

Exclusive Representative For

TONNELLERIE MERCIER

The finest French barrels, puncheons and tanks. Our wood is hand picked from the major forests of France by our maitre d'tonnellerie, and coopered to your satisfaction. We always maintain inventory at Custom Cooperage.

KENTUCKY COOPERAGE

American oak barrels fire set over an oak fire. The wood is air dried rather than kiln dried to help soften the flavors of the oak.

INNERSTAVE™

Extend barrel life indefinitely.

INNERSTAVE™ is the only real alternative to the new barrel. The price of INNERSTAVE™ can save you $160 per barrel.

All products sold by Custom Cooperage are warranteed by us.

custom cooperage

1194 Maple Lane, Calistoga, CA
(707) 942-6902

Capsules — The Silent Salesmen

Tony Munro

The expression 'First impressions count' applies particularly when parting with money via a salesperson. In presenting your wine to the consumer, your package must give the right impression of quality immediately. Rarely does one get a second chance.

All too often wineries spend large sums of money on market surveys to ensure their product is right. Design consultants produce the label, in some cases a special bottle is used, and then, *any* capsule is added to the bottle.

In most cases, a bottle of wine must be sold several times before it is consumed, and only after that is the client thinking of that next bottle.

First, it must be purchased by a restaurant, hotel or wine merchant. Then consumers must be seduced by product reputation, special prices, advertising, prominent listing on wine lists, etc. However, with all the above, the consumer must still be tempted to buy and consume the contents, *i.e.* total product presentation must be used to encourage the consumer to open the bottle. Often wine is laid down on the shelves with only the capsule showing, and all the effort put into label design and choice of bottle is lost. Then only the capsule sells your wine.

Similarly, with cut-carton bulk stacking, these displays are usually only 3-4 cartons high, and again the consumer, looking down at the bottle, is exposed more to the top of the bottle than the label.

Once purchased, wine is often cellared on its side. Again the capsule is the only form of identification available, and there is more chance of choosing that same wine near the time of consumption, and therefore a greater chance of a repeat sale.

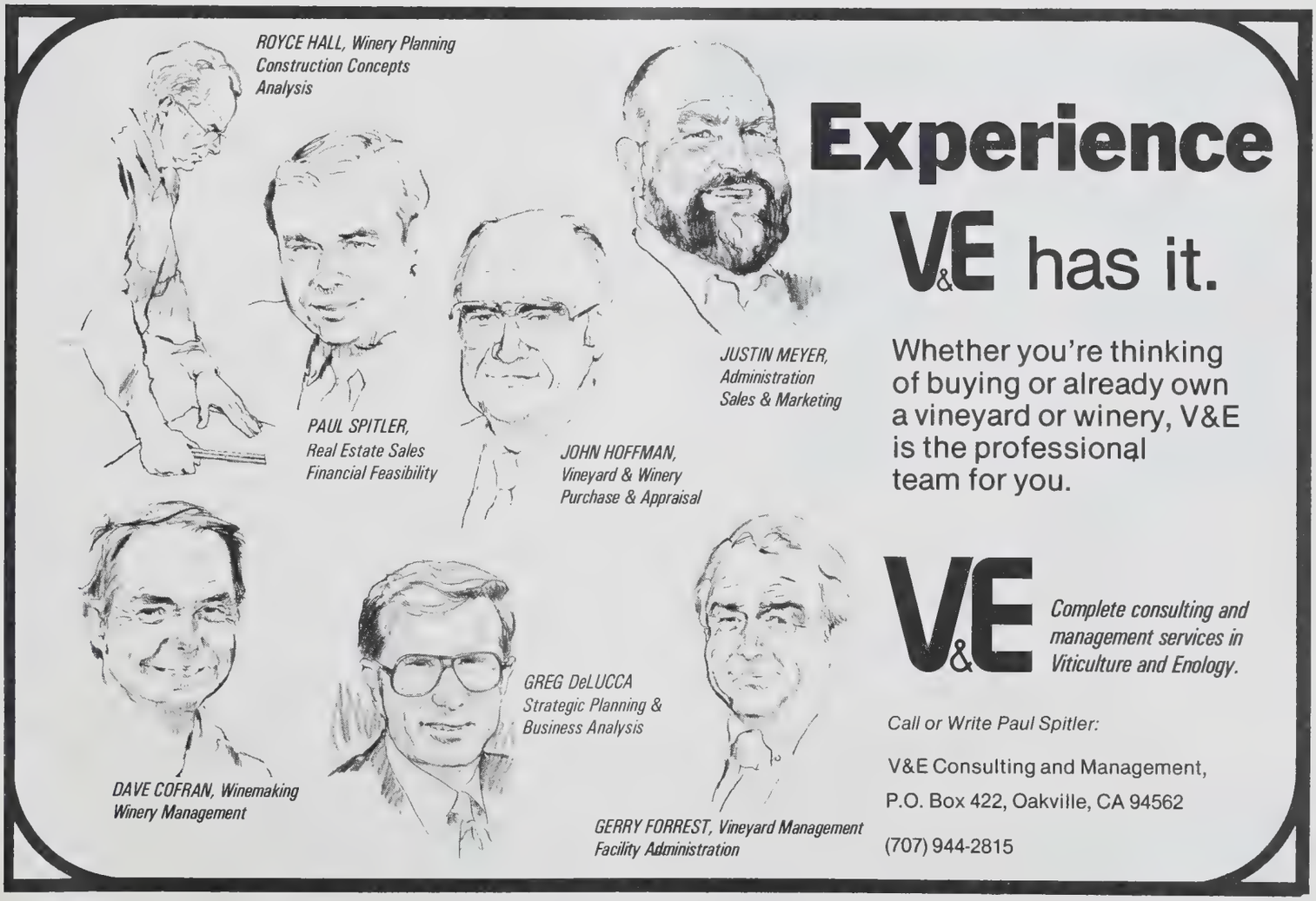
In restaurants those unfamiliar with wine often will be tempted to order what the other table is drinking. Again, an easily identifiable capsule could mean another sale.

It is common knowledge that the growth market in Australia in the last 5 years has been the 'bag-in-box' segment. While this segment represents volume, for most companies it is a low-profit area.

However, profitability does exist in the cork-finished market even though this segment is slowly decreasing (in Australia). It is the market that all wineries aim at, particularly the 'up-market' area. The bottled market is also the market under attack from increasing imports, and it must be observed that most imported products are well-packaged.

What makes a good capsule? The following remarks are common to all types of capsules, but refer specifically to the modern tin/lead capsule. Areas to consider are cost, application, and design.

In respect to cost, a number of options are available, from



heat shrink to tin/lead. The market the product is aimed at usually determines the cost of capsule used.

Application is important as often the right capsule is used, but the product presentation is spoiled because of poor application. If care is taken initially in the purchase of a quality product, proper application is only a matter of ensuring the machines are right during time of bottling/capsuling. This can be achieved by careful attention to the capsuling machinery during the operation. It is important with tin/lead capsules to ensure that all capsules are supplied with satisfactory separation rings and suitable export packing.

In design, one can be individual and design a capsule that gives the total package an individual look, a look that stands out from the others.

In the early days of bottling wine, the capsule performed a definite function: it was necessary to ensure a proper seal as bottles and corks alone were not reliable. Sealing wax was the most common type of secondary closure/capsule used. Today, however, with modern methods of bottle manufacture and strict control of cork purchase and treatment, the capsule is now purely a traditional and decorative means of enhancing bottle presentation and of identifying the product.

Points to consider in capsule design are:

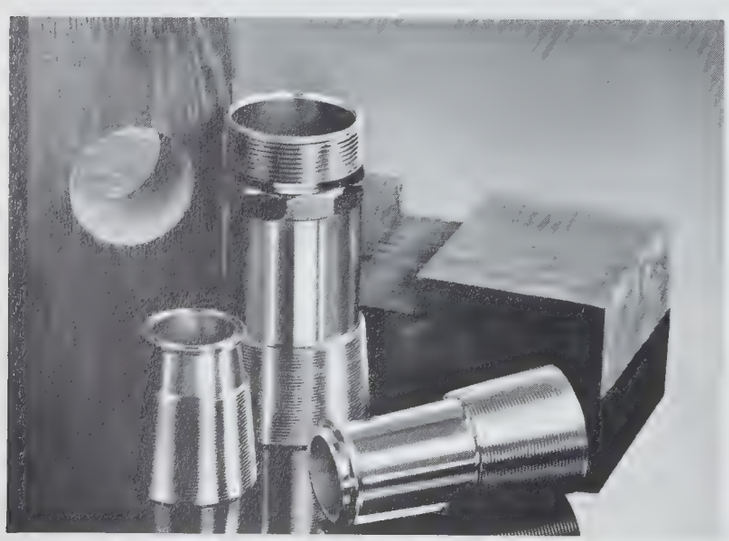
Identification of Winery If your winery has an easily recognizable logo, color, and/or print style, it is advantageous to incorporate this in the capsule design. If identification of company is the important thing, it is wise to consider the one design for all products, or perhaps even the one design and one color capsule for all products.

Identification of Product In some cases it is the product that needs to be highlighted. If this is so, look at unusual colors, lengths or designs.

Compatibility with Label Sometimes a capsule in harmony with the label is important, in other cases a bold contrast give the desired effect, *i.e.*, to gain attention.

Compatibility with Bottle This is very important, as a capsule not compatible with the bottle will not apply correctly,

Capsules can be decorated many ways and have three separation types to suit various dispensers. Left: Nochen; center: intermittent; right and top: continuous.



Stefanich leakproof stainless steel fittings.

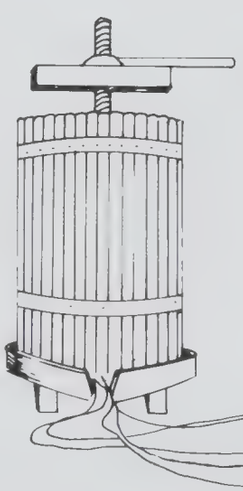
Stefanich stainless steel wood tank fittings set new standards of sanitary, leakproof service and ease of installation. Their unique, one-piece design eliminates lock nuts, washers and gaskets. The threaded section has a precise 5° taper, and screws into a reamed hole. The result is a complete 3-inch sealing surface that inhibits outward seepage.

Stefanich nipples come in three models and a wide range of sizes, fully compatible with NPT, "I" clamp and "T" clamp fittings.

Stefanich
P.O. Box 77021, 110 Freelon Street
San Francisco, CA 94107 Tel: (415) 974-5526

PICKERING WINERY SUPPLY

For All Your Maintenance & Chemical Needs
Exclusive Distributors



O'SULLIVAN
Paints & Specialty Coatings

- EPOXY COATINGS
- MILDEWCIDES
- LATEX & ENAMELS

SELLERS Tank Washers

- MODELS TO CLEAN ANY SIZE TANK ECONOMICALLY

WINERY CHEMICALS
100 lbs. TO CONTAINER LOADS
ALL TYPES OF FLOOR COATINGS

415-821-2400

1300 22nd St., San Francisco, CA 94107

SEE US AT A.S.E.V. BOOTHS 101-103

and the end result is a 'wrinkled mess' on top of the bottle. With the ever-increasing number of special imported bottles now used, and the changing neck sizes of local bottles, the capsule should always be compatible with the bottle used.

Highlight Information and/or Event In many cases the capsule can be used to highlight information *not* on the label, *e.g.* tax paid, regional wine, vintage years, export quality, etc., or alternatively to highlight a special event (first bottling, commemorative bottling, chairman's selection, etc.)

Promotional Use Capsules specially printed could be used as premiums/entry forms, etc., for brand promotions.

Highlight Quality As practiced in European countries, a particular color can indicate sugar levels, stripes can indicate medals or diplomas.

The tin/lead capsule can be considered a 'tailor-made suit' for the following reasons:

Quantity Because of its method of manufacture, relatively small runs (10,000 or less) can be done, thus allowing for that special capsule for almost any product.

Colors With tin/lead capsules, almost any color can be produced, enabling capsules to be exactly matched to label or in complete contrast with it. Additionally, modern technology allows a wide range of metallic colors. Capsules are available in mat colors and are scuff-resistant.

Print Capsules can be printed on the side in up to 5 colors.

Tops This is an area often neglected in capsule design. In so many cases it is only the top that is seen, and yet the customer sees only a plain top, or an image that is not recognized. The top should clearly carry a message that is easily recognizable, *i.e.* vintage year, company name, region, company logo, etc. In the past this was embossed, and then colored. Now top print has been perfected. This has many advantages over the old embossing method:

- more definition
- brighter colors
- embossing will not flatten out during application and transportation
- finer detailed designs can be used
- cost of print on top of a capsule is less than embossing and coloring.

Tear tabs can also be offered at little extra cost. Tear tabs (that really work) can be offered on tin/lead capsules in two styles: one for table wine, the other for fortified wines.

What is the cost of this 'Silent Salesman'? Whether the capsule be a low cost PVC or an up-market tin/lead capsule, rarely does the cost of the side and top print capsules with tear tab exceed $.01 per capsule of a premium over a plain capsule. At very little extra cost your bottle of wine can be a total package and sell the contents within the bottle regardless of its shelf position.

Tony Munro is Marketing Director, Anthony Smith & Associates, Ltd., Australia

Secondary Closures Purchasing Guide

ANTHONY SMITH & ASSOCIATES PTY. LTD.

Croydon Park, South Australia

A.S.A. are the agents in Australia and New Zealand for V.K.N.-Nackenheim of West Germany offering tin-lead, PVC heat-shrink and poly-laminate capsules for wine and champagne bottles.

Tin/Lead

Custom design capsules are available in minimum orders of 10,000 printed capsules, however quantities of less than 25,000 carry a production surcharge. Capsules are available in lengths to 65mm and of diameter to custom fit any Australian, European or New Zealand bottle, also in lengths of 115mm for champagne bottles. All capsules have a special shouldered top so that the capsule is perfectly centered on the bottle after dispensing so ensuring perfect spin-on.

Color matches are available and side print is available in up to 5 colors. All paints used are of a scuff-free type. The manufacturer has perfected 'Top Print', giving far greater definition on the top and enabling customers the opportunity to reproduce fine detail. A special top 'tear-tab' perforation is available at little cost.

Samples can be supplied at no cost or obligation. All capsules are produced by the 'continuous casting' method, ensuring an even tin coating over the lead alloy core.

Capsules are supplied with separation rings (3 different types to suit various dispensers): Continuous, intermittent, Nocken (French style). Standard colors in standard sizes available are: black, gold, flor red, silver, white, red and green.

PVC & Polylaminate

Custom designed capsules are available in lengths to 70mm and can be printed in up to 5 colors and have printed tops. Standard colors for PVC are black, burgundy, cream, gold, red, and white. Polylaminate capsules are made to order in minimum quantites of 50,000 units.

Inquiries to Anthony Smith & Associates Pty. Ltd., 1 Days Road, Croydon Park, South Australia 5008; Phone: (08) 46-9321; Telex: AA87116 ASCORK

SEE OUR AD PAGE 62

CALIFORNIA GLASS COMPANY

San Francisco, CA

Tin-Lead

Erben, an Austrian manufacturer, is represented by California Glass Co. Stock capsules are available in the following colors: gold, maroon, green, silver and creme. These capsules are 28.5mm X 50mm, and come with a grape cluster embossed top stamp and two breather holes.

Custom capsules to your design and color specification can be manufactured. The minimum order is 20,000; allow 6 weeks for delivery. Aluminum capsules are also available on special order.

Capsules for large bottles, 3-12 liters, can be ordered in gold, white and maroon. A special oversize semi-automatic spinner is available on a rental basis.

Inquiries to California Glass Company, 2098 Oakdale Avenue, San Francisco CA, 94124; Phone: (415) 641-7700; Telex: 6771196.

CORK & SEAL OF CALIFORNIA, INC.

Vallejo, CA

Champagne

Aluminum or Polylaminated Foils are custom made in Vallejo, CA. The sides can be decorated in 1-3 colors by the rotogravure process. The top disc can be printed in 1-3 colors. Four types of finish are available: smooth; embossed with a large diamond pattern; embossed with a small diamond pattern; or pebbled. The length of the skirt can be custom-fit to the package.

Tin-Lead Champagne Foils are custom made in France by Koeltgen. Printing in 1-3 colors is available on the top and/or sides. Embossing is available on the top and/or sides. The capsules are only available with a smooth finish and require eight weeks for manufacture plus shipping.

Inquiries to Cork & Seal of California, Inc., 5415 Napa-Vallejo Hwy, Vallejo, CA 94589; Phone: (707) 257-6481; Telex: 17692401

SEE OUR AD PAGE 54

DEMPTOS GLASS COMPANY

Napa, CA

Tin-lead

Capsules manufactured by Capsulerie de Gouvieux in France are available. Stock capsules are available in the 28.75mm diameter X 50mm length size in colors of gold, silver, flor red, and white. Custom designs, colors and sizes are also available. Over-size capsules for the Demptos 3.0L, 5.0L, 6.0L, and 9.0L bottles are also offered in gold, red, flor red, white and silver. Demptos has a special capsuler available to their over-size bottle clients.

Inquiries to Demptos Glass Co., 849 Jackson St. Suite 1-A, Napa, CA 94559; Phone: (707) 252-7688; Telex: 510 744 2102

ENOTECH CORPORATION

Palo Alto, CA

Enotech represents VKN-Nackenheim of West Germany which produce tin-lead wine and champagne capsules, aluminum and PVC heat-shrink capsules, as well as the proprietary 'Enocap', which is the tight-fitting polyethylene stretch-on capsule used by Peter Sichel's 'Blue Nun' label. In addition, due to the growing popularity of collector bottles, special over-sized tin-lead capsules are available to fit 3.0L, 5.0L, and 6.0L imported bottles.

Tin-Lead

Minimum order for a custom design and color is 25,000 capsules with lead time being approximately 14 weeks, (approximately 10 weeks by air freight). Colors can be matched to customers' specifications based upon color samples or PMS numbers. In addition to colored top embossing or no-charge blind top embossing, capsule tops can also be imprinted. Special skirt imprinting techniques by silkscreen or offset printing are available in up to five colors. After lacquering and printing, capsules are dried in heat tunnels to cure the paint.

To optimize spinning, tops can be configured with top shoulder for snugger fit around bottle neck rim. Separation rings are standard and can be adapted to suit various types of automatic capsule application machines.

Stock capsules in 28.75mm diameter X 50mm length in bronze gold, bright gold, silver, light and dark red flor, green flor, glossy green, white, and cream are warehoused in South San Francisco, CA. Capsules with a 30mm top diameter for European-neck finish push-up Burgundy bottles and U.S. 1.5L magnum bottles are stocked in yellow and gold. Minimum order is one box of 1,600 capsules.

Special Capsules

Aluminum, PVC heat-shrink, and polyethylene 'Enocap' capsules are available in custom orders of 100,000 minimum. Aluminum and 'Enocap' capsules require special prepleating, respectively stretch-on application equipment, which is available through Enotech's associated company, Otto Sick Corporation.

Inquiries to Enotech Corp., PO Box 576, Palo Alto, CA 94302, Phone: (415) 858-1090; Telex: 348362 ENOTECH PLA

SEE OUR AD PAGE 9

fp PACKAGING, INC.

South San Francisco, CA

Aluminum

Single weight aluminum and aluminum polylaminate capsules for both sparkling and still wines are available. Sparkling wine aluminum capsules in bright gold and white are in stock. Still wine polylaminate capsules are stocked in matte gold and buff. Custom orders are produced at the fp plant in Peoria, IL.

Plastic 'Push-On'

A stock inventory of West plastic 'push-on' capsules for 750ml and 1.5L bottles with a tear-tab is maintained in the following colors: green, maroon, black, ivory, gold and white. Minimum order of stock capsules is 1,200. Custom orders of 50,000 minimum can be produced.

Tin-Lead

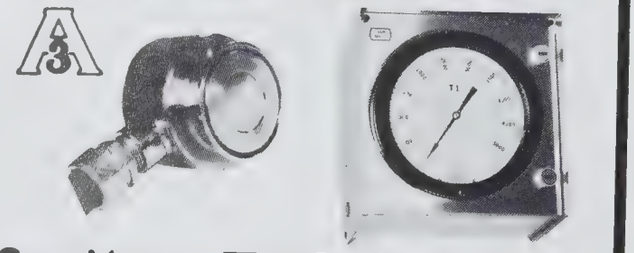
Stock capsules are available in gold, black, white, burgundy, red, silver, pewter, and green in the 28.5mm X 50mm size and feature a separation system. Minimum order for stock capsules is 2,500.

Custom orders are available in 50,000 minimum and can be printed in 1-3 colors and top embossed. Delivery for custom orders is 12-15 weeks. A bottle sample, the method of application, bottling line speed, and sample color matches are required on custom orders.

PVC Heat-Shrink

PVC closures in four different forms depending on the winemaker's application can be ordered. Available are cut-bands, open-top preformed, closed-top preformed, and sleeves furnished in rolls. Minimum orders for preformed capsules

HOW MUCH WINE is in that vat?



Sanitary Tank Gauging weighs liquid—not foam

Designed for continuous inventory of insulated and single shell stainless steel wine vats. Can be CIP cleaned in place. *Sanitary level sensor* is placed in bottom of tank. Inside, a *stainless steel diaphragm*, authorized by 3-A, won't harden or rupture due to daily cleaning, senses content's hydrostatic pressure. Signal is sent pneumatically to local or remote *circular scale gauge*. Readout in gallons, or metric units. *Digital display optional.* All wetted parts 316 stainless steel, including diaphragm.

Write for Bulletin No. 801 for details

TANK MATE® TANK MATE Division MONITOR MANUFACTURING

PO Drawer AL • Elburn, IL 60119 • 312/365-9403 • Telex 72-0437

are 50,000 and require approximately 10 weeks for delivery.

Inquiries to fp Packaging, Inc., PO Box 881, S.San Francisco, CA 94083; Phone: (415) 871-5497

INTERNATIONAL CLOSURES & SUPPLIES COMPANY, INC.

San Leandro, CA

Cebal, a French manufacturer of tin-lead, PVC and aluminum capsules for wine and champagne is represented. Capsules are available in all sizes, a full range of colors, custom-printed by silkscreen, offset, rotogravure or letterpress with embossing and hot-stamping capabilities. Short lead times are offered. Samples can be prepared at no cost.

Inquiries to International Closures & Supplies Co., Inc., 2997 Teagarden St., San Leandro, CA 94577; Phone: (415) 483-3750; Telex: 172623.

SEE OUR AD PAGE 34

KLR MACHINES, INC.

San Rafael, CA and Bath, NY

PVC Heat-Shrink

Customized PVC heat-shrink capsules from SANOPLAST in Switzerland are available. In addition to flexibility in color and printing, PVC capsules provide a low-cost alternative to tin-lead capsules. Not only are per unit costs for PVC a fraction of tin-lead costs, heat shrink tunnels require only a fraction of the capital investment required for foil spinners. A further advantage is that light-weight PVC capsules are flexible and therefore less susceptible to being misshaped and destroyed during manual capsule application. All modern capsule dispensers can dispense PVC heat-shrink capsules at least as easily as tin-lead.

SANOPLAST capsules are first printed as flat stock and then rolled into shape. This allows a range of reflectivity, from dull matte to highly reflective metallic, which most closely resembles traditional tin-lead. Flat stock printing has the further advantage over extruded (tubular) PVC capsules in that the capsule is not creased or wrinkled during printing.

The exact closure, bottle mouth and neck configuration must be specified to insure a precise fit, otherwise wrinkling will occur. Additionally, a heat shrink tunnel with very high temperature/short time heating is required to prevent wrinkling, disc separation, tear-tab protrusion, etc. (KLR offers a SANOPLAST heat-shrink tunnel). For these reasons, KLR accepts no orders without on-site evaluation of each winery's specific requirements, and shrinking trials in our laboratories in the U.S. and Switzerland.

Inquiries to KLR Machines, Inc., 1925-B Francisco Blvd. East, San Rafael, CA 94901; Phone: (415) 456-4774; Telex: 380-753; 47 W.Steuben St., Bath, NY 14810; Phone: (607) 776-4193; Telex: 510-252-1250.

SEE OUR AD PAGE 30

LAFITTE CORK & CAPSULE COMPANY

Menlo Park, CA.

Tin-Lead

Capsules are produced by Lafitte's subsidiary, Bouchage Metallique, in St. Gaultier, France. All capsules are produced by the 'drawn' method of production (consecutive elongation) rather than the 'spun' method of production. Custom deco-

Nature doesn't produce even growth. Designed drip irrigation does.

Sure, nature gives you water. But not when you need it.

That's work for Water Dynamics.

Water Dynamics designs agricultural drip irrigation systems, starting at the source and taking it to the plant.

The effect of topography, the growth pattern of the crop, the soil itself are important, because the final design must deliver the right amount of water at the right time.

That's how Water Dynamics produces even growth. By design. And that's why Water Dynamics will be there to service your system — crop after crop after crop.

water dynamics incorporated

659 Main Street, St. Helena, CA 94574 • 707 963-5822

the recognized professionals in north coast viticultural irrigation

rated orders are accepted for quantities as low as 25,000 pieces in any size. Capsules with multi-colored top embossing or printing and side decoration in up to four colors are available. Side printing application is done by use of the silk screen method although offset printing is available should a customer so specify. Lafitte recommends silkscreen side printing due to the fidelity of colors and designs. Customers are advised to allow 3-4 months (from approval of pre-production samples or order entry date) for delivery to the winery.

Any size/taper compatible with a variety of bottle finish sizes is available. Customers should submit either bottle drawings or bottle neck samples for correct sizing of capsules (primary emphasis on imported bottles.)

Stock tin-lead capsules of 28.5mm X 50mm size for 750ml bottles in the following colors are: gold bronze (lacquered), brilliant gold, uncolored/silver (lacquered), matte cream, matte black, dark flor red, light flor red, opaque green, opaque white, burgundy, and yellow. All capsules are produced with a taper compatible with 'standard' 750ml bottles.

Packaging is available for use with automatic dispensers or hand application. Capsules can be produced with either top 'dents' or embossed rings depending upon the application technique or interference with decoration.

PVC Heat-Shrink

PVC capsules are produced on Congex forming machines located in Lafitte's Menlo Park facility. Stock capsules in various colors to fit 750ml and 1.5L bottles are available. Larger sizes are available by special order from Coliege Metalco, Lafitte's parent company in France. Orders for stock solid colors can be shipped within two weeks of order date. Custom-decorated orders require a lead time of not more than six weeks. Aluminum top discs are applied in a color matching the body color of the capsule, or any other chosen color.

Aluminum & Polylaminate

These capsules can be produced on the same Congex machines in Menlo Park. A limited color selection is available for short-order requirements.

Champagne

Lafitte is the American agent for Voye-Coquillard (A.J.O.) in Epernay, France. Due to the complexity of Champagne capsules, Lafitte suggests that customers make inquiries on either plain or decorated capsules.

Inquiries to Lafitte Cork & Capsule, Inc., 1180 Hamilton Ct., Menlo Park, CA 94025; Phone: (415) 322-1838; Telex: 824093

SEE OUR AD PAGE 7

LATCHFORD PACKAGE COMPANY

Los Angeles and San Francisco, CA

Tin-Lead

Latchford represents the manufacturer, Betts and Company of London, England. The Betts manufacturing process guarantees wall thickness and improves color adhesion by continually casting virgin lead and applying the tin by pressure welding. Stock capsules are available in the following colors: cream, gold/bronze, brilliant gold, uncolored/silver, yellow, black, blue, two shades of green and three shades of red. The standard size 28.5mm diameter by 50mm length is compatible with most 375ml and 750ml bottles made in the USA. Capsules in size 29.5mm X 50mm for French bottles and some domestic 'dead-leaf' green bottles are also available. Minimum purchase from stock is one case, (approximately 2,000 pieces).

Custom capsules available directly from England can be obtained in lengths from 34mm to 60mm, for standard 375ml and 750ml bottles as well as the larger 1.5L and double magnums. Customer orders should specify bottles to insure the correct capsule size.

For custom orders, Betts offers top embossing with a custom design or logo in the same color or as many as two colors distinct from the base color. Printing on the capsule top is not recommended as experience has shown that contact with the case during transit removes the paint. Capsule tops can be supplied without or up to four perforations. A minimum of one top perforation is suggested to prevent condensation between cork and capsule and to let air escape during application.

Customer design on the capsule walls is available by either printing or embossing. All capsules come with large embossed separating rings which keep the capsules separate from one another but which 'disappear' after application. The top dent separating feature sometimes required for dispensing machines is available on custom orders.

Tin-Lead Champagne

These capsules are available from France on custom order basis only and can be top embossed, side embossed, side printed in virtually any color and any length.

PVC Heat-Shrink

PVC heat-shrink capsules are available from stock in lengths of 29mm X 50mm for 750ml bottles or 30mm X 60mm for 1.5L bottles. Stock colors are gold and red. Minimum purchase is one case, approximately 5,000 pieces.

Custom capsules with embossed aluminum discs and side printing can be ordered. Latchford supplies 'heat guns' for small-volume users and can supply heat tunnels of various lengths for higher volume lines. 'Cut-bands' as well as open-top 'pre-form' capsules used with a bar top cork on any application requiring a tamper-evident feature is also available on a custom order basis.

DEMPTOS
COOPERAGE

MANUFACTURERS & IMPORTERS
OF SUPERIOR FRENCH OAK BARRELS
CUSTOM DESIGN UPRIGHTS & OVALS
SHAVING, FIRING & BARREL REPAIR

(707) 257-2628 • 849 JACKSON STREET, NAPA, CA 94559, U.S.A.

Aluminum and Polylaminated Champagne Foils

A stock of gold polylaminated capsules in size 35mm X 120mm is maintained. Custom orders can be made.

Inquiries to Latchford Package Co., 1823 Egbert Ave., San Francisco, CA 94124; Phone: (415) 467-1440; Telex: 910 372-7256; PO Box 01707, Los Angeles, CA 90001; Phone: (213) 587-7221; Telex: 213 588-4451; 910 372-7256

MACK-WAYNE CLOSURES

Wayne, NJ and Santa Rosa, CA.

Plastic Sleeve

Mack-Wayne presently offers plastic wine sleeves which are applied through a friction method to cork-finished bottles and to bottles using aluminum tamper-evident closures. Capsules are available for 750ml and 1.5L bottles.

One of Mack-Wayne's new specialties is the 'Surlys' sleeve, a closure for straight-cork bottles that adopts the shape of the bottle neck without heat.

The four size-type sleeves available are M sleeves, magnum sleeves, C sleeves with A-tab, and the 'Surly' sleeve. Standard colors available are white, green, gold and burgundy. Custom color matching and silk screening are also available.

Minimum orders for stock items are one case lots, and 50,000 pieces on custom orders. Delivery is 3-6 weeks on stock orders, 6-9 weeks on custom.

Inquiries to Mack-Wayne Closure Division, 1235A Route 23S, Wayne, NJ 07470; Phone: (201) 696-1212; PO Box 2493, Santa Rosa, CA 95401; Phone: (707) 584-9711.

SEE OUR AD PAGE 56

MOFFETT CO., INC.

San Jose, CA

Tin-Lead

Stock capsules are 28.75mm X 50mm and have a narrow 1:25 taper which gives a tight smooth fit on most 750ml bottles used in the USA. Stock capsules have two vent holes, separation rings and a self-color, grape cluster top-stamp at no extra charge. Stock colors are: dark green matte, light green matte, gold/bronze, beige matte, red flor, bright red opaque, silver, white opaque, and yellow opaque.

Custom capsules are available in special colors with top-stamps and printing in up to four colors. Artists are available to design a custom capsule.

To order capsules, the bottle to be used must be specified and whether a straight wine cork or bar-top cork will be used. The specifications in a capsule order should include the top diameter, length, taper and color.

In addition, a winery can specify the number of vent holes, with a separation ring or without (a separation ring is a raised bead around the capsule skirt which allows easy separation of capsules from each other). Embossed top-stamp and printed decorations can be specified. It should be noted if the capsules are to be put on by automatic application.

Inquiries to Moffett Co., Inc., 6985 Via Del Oro A-5, San Jose, CA 95119; Phone: (408) 578-4910

RAMONDIN, U.S.A.

Burlingame, CA

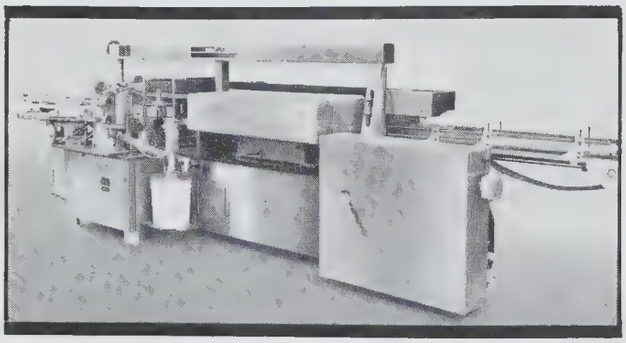
Tin-Lead

Ramondin produces tin-lead capsules in their factory in Spain.

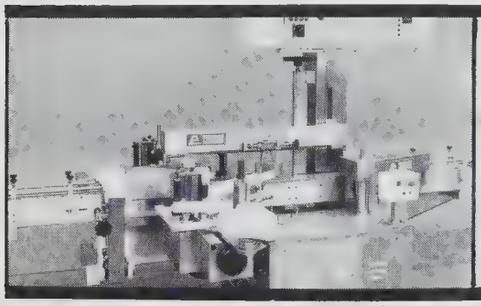
MeyerWorld® Class Packaging Machinery

Serving: Food, Drug, Cosmetic, Wine, Distilling and Chemical Industries

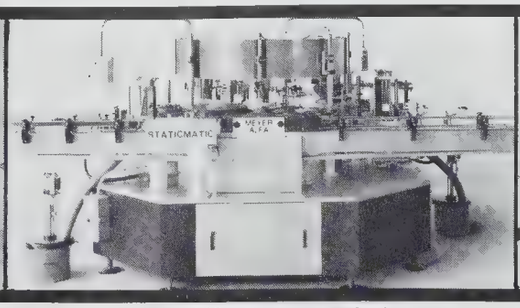
MeyerWorld provides a wide range of production capabilities from low to high speed, for the labeling and still liquid filling markets. Extremely flexible, the labelers adapt to most shapes and sizes, paper or foil labels and plastic or glass containers.
MeyerWorld offers • World Masterline and Compact CM Labelers, World Feeders-Feeder cleaners • MEYER/Precision quality P-S labelers • MEYER/Alfa labelers • MEYER/Cortellazzi low and high vacuum still liquid fillers.



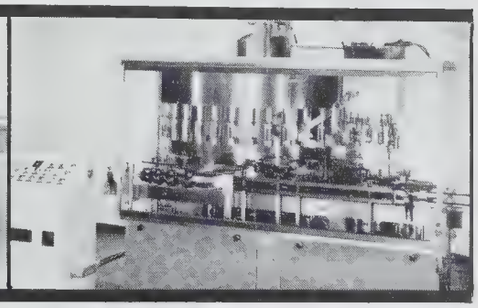
World Masterline Labelers



MEYER/Precision P-S Labelers



MEYER/Alfa Rotary Labelers



MEYER/Cortellazzi Fillers

MEYERWORLD® Packaging Machinery
A FIGGIE INTERNATIONAL COMPANY

For Industry-Recognized MeyerWorld Class Customer Sales and Support call 1-800-343-6098.

P.O. Box 866, Worcester MA 01613
60 Prescott Street, Worcester, MA 01605/Tel. (617) 755-3110 Cable: MeyerWorld Telex: 920-483

Capsules are available in the 28.75mm X 50mm size. Stock colors include beige, black, maroon, silver, white, and yellow and various shades of gold, green, and red. Separation rings are standard.

Custom capsules sizes include 28mm to 31mm diameter and lengths from 40mm to 65mm. Custom colors can be reproduced in wide variety, based upon customer's sample. Minimum orders on custom work varies and the lead time is 60-90 days.

Decoration includes up to two colors on the top and up to three colors on the side. Holes in the head and painted top embossing are available.

Inquiries to Ramondin U.S.A., 1041 Edwards Rd., Burlingame, CA 94010; Phone: (415) 340-7225; Telex: 296117 RAMD UR

RLS EQUIPMENT CO., INC.

Egg Harbor City, NJ

Tin-Lead

Stock capsule colors include: green, white, gold, silver, yellow and red flor. Capsule sizes range from 28.75 X 50mm to 31 X 60mm. Custom sizes, printing and design are also available.

Inquiries to RLS Equipment Co., Inc., PO Box 282, Egg Harbor City, NJ 08215; Phone: (609) 965-0074; Telex: 215406 RLSCO

SCOTT LABORATORIES, INC.

San Rafael, CA

PVC Heat-Shrink

Three types of PVC heat-shrink closures manufactured by AF Seal, Inc. available are: a cut-band which is used over a bar-top cork or screw cap; an open top preformed capsule for bar-tops of all shapes, as well as, screw caps and ROPP, and closed capsules for all applications with tops made of aluminum, paper or plastic.

Stocks of PVC capsules in maroon, green and gold are maintained in the U.S. in two sizes: to fit standard 750ml and standard 1.5L bottles. Customers are requested to always confirm their bottle manufacturer and mold before ordering stock capsules. Custom orders of PVC are accepted in a minimum of 100,000 units.

Tin-Lead

Stock colors are: black, blue, creme, dark green, light matte green, yellow, white, maroon, metallic flor red, gold and silver.

Custom tin-lead capsules are normally available in orders beginning at a minimum of 25,000. Orders take 12 weeks to process and ship but depending on prebooked orders, may not get production time for 10-12 weeks. Delivery will always be confirmed at time of order. Custom embossing and/or printing can be done on the top. The exact bottle neck size and shape must be specified when placing an order. Also, it is important to know whether a semi-automatic horizontal spinner or fully automatic vertical spinner is being used.

Scott notes that tin-lead capsules vary slightly between manufacturers due to the proportion of antimony added to the capsule material as a hardening agent. Capsules with a greater proportion of antimony are easier to paint and are less susceptible to crushing in transit. These 'crisper' capsules are, unfortunately, more susceptible to wrinkling on certain spinners than capsules with less antimony. The antimony level will also be a factor affecting the capsule taper used by the manufacturer.

Tin-lead capsules are available (at customer option) with separation aids. Aids can be: a wax paper separation between capsules; a top separation to prevent impacting; or a ring separation to prevent impacting. Wax paper separation is the rarest of these types of separation and the only one for which there is a charge. The decision to use other types of separation may be influenced by the following factors: placement of artwork on the capsule; taper desired for the capsule; and whether capsule dispensing will be manual or automatic. As a consequence of these factors there is no simple recommendation. All purchases are individual.

Scott tin-lead capsules are generally packed in boxes of 2,500 which are then placed in crates of 25,000. Separators are placed in every crate to prevent crushing of boxes. It is recommended that the capsules remain in the protective crates until shortly before use. As other capsule protection options, Scott also offers cardboard layer separators and wooden boxes at a slight upcharge. There are three dimension specifications for tin-lead capsules: length, diameter and taper. Tin-lead capsules normally elongate about 10% during application.

Aluminum & Polylaminated Aluminum

Champagne capsules in aluminum and polylaminated aluminum are available in both one or two piece construction depending on customer need. These capsules are most commonly applied with a special crimping boot or pleater and crimping boots in combination. Champagne capsules are also available from Scott in PVC and tin-lead. All champagne capsule orders are custom.

Inquiries to Scott Laboratories, Inc., PO Box 9167, San Rafael, CA 94912; Phone: (415) 457-8460; Telex: 171494 Scoti SRFL; 950 Brock Road South, Pickering, Ontario, Canada L1W2A1; Phone: (416) 839-9463; Telex: 06-981445 Scottlab PICK

SEE OUR AD PAGE 3

SEITZ ENZINGER NOLL MACHINES, INC.

San Rafael, CA

PVC heat-shrink capsules made by Morlo of West Germany

JABSCO PUMPS®
FOR THE WINE INDUSTRY

PUMP MODEL 12490-0001. Self priming, and constructed of 316 stainless steel, these pumps have totally enclosed, fan cooled, thermally protected 115/230 Vac single phase motors. Quick take apart for easy cleaning and service.

RUBBER TIRED CART
Gives you mobility and versatility in your pumping operations. Model 45838-0000.

SEND FOR FREE LITERATURE

ITT JABSCO®

ITT Corporation, 1485 Dale Way, Costa Mesa, CA 92626
Telephone (714) 545-8251

are available. Tin-lead capsules from the same supplier will be available in the second half of 1985.

PVC Heat-Shrink

These capsules are available with delivery times of 4-12 weeks depending upon quantity and artwork. Standard capsule sizes in gold, green and burgundy are available in San Rafael, CA. Capsules can be made with various types of tear tabs, different top discs or they can come with open top for all bottle sizes. The capsules can be separated easily and can be handled on fully automatic high-speed dispensers.

Inquiries to Seitz Enzinger Noll Machines, Inc., 3095 Kerner Blvd, Suite G, San Rafael, CA 94901; Phone: (415) 457-5155

SEE OUR AD PAGE 58

TEMPLOCK CORPORATION

Carpinteria, CA

PVC Heat-Shrink

Templock Corporation is a manufacturer of heat shrinkable PVC tubing and cut-band material. Templock also manufactures a line of automatic application systems with speed ranges from 50 to 600 containers/minute. Tubing and cut-bands are available in stock colors. Custom colors can be matched from customer label stock, or by PMS color number. Printing in up to four colors is performed at the Carpinteria plant.

Templock tubing can be custom formulated to match specifications for automatic application equipment. Sizes available are from 14mm LF to 200mm LF in gauges from .05mm to .11mm. Lead time varies from two weeks for standard sizes and colors, to six weeks for custom colors and custom printing. Minimum order is 10 kilometers or 100,000 cut bands.

Inquiries to Templock Corp., PO Box 40230, Santa Barbara, CA 93103; Phone: (805) 684-7676; Telex: 65-8432

SEE OUR AD PAGE 55

2K PACKAGING ENTERPRISES, INC.

Beaverton, Oregon

Aluminum

As North American representative for Aluminiumwerk Tscheulin, 2K can provide aluminum capsules in standard weight and heavy gauge. Capsules are available from the Portland, OR warehouse in stock designs and colors. Custom design and color capsules can be ordered in a minimum of 100,000 units. Smaller quantites can be produced under special circumstances for nominal upcharges.

Aluminum champagne capsules or 'Duplo' (polylaminated) champagne capsules are available. Standard designs and colors are kept in stock, and custom orders are accepted.

PVC Heat-Shrink

High quality PVC wine capsules produced from roll-stock are available. Tscheulin produces the following stock colors: burgundy, dark green, and gold. Custom orders are accepted. All capsules can be supplied for automatic dispensing at no extra charge.

Inquiries to 2K Packaging Enterprises, Inc., 7914 SW Nimbus Ave., Beaverton, OR 97005; Phone: (800) 874-9722, (503) 641-8990; Telex: 151733 twok beav

SEE OUR AD PAGE 22

WINE INDUSTRY SUPPLIES

Thebarton, S.Australia

Plastic Push-on

Stock capsules are 55mm long, with a tear tab for metric finish bottles. Colors are cream, gold, red, or white with a minimum order of 1,600.

PVC Heat-Shrink

Stock closed capsules with gold foil tops for metric finish bottles are available with or without a tear-tab in 28.5mm X 31mm, and either 50mm or 55mm long. Colors are burgundy, gold, black gloss, red, or white and the minimum order is 5,000. The size for stein finish bottles is 27mm X 29mm and either 50mm or 55mm long and are available with or without tear-tab. Colors are black matte, black gloss, burgundy, gold, red, or white in minimum orders of 10,000.

Custom orders with side print and/or top print are available in any number of colors. Minimum order is 50,000 and delivery requires 12-16 weeks.

Aluminum Foil

Stock capsules for cork-finished still wine are 29mm X 50mm, and come with a top embossment and three top perforations. Colors are black gloss, gold, red flor, or white in minimum orders of 10,000.

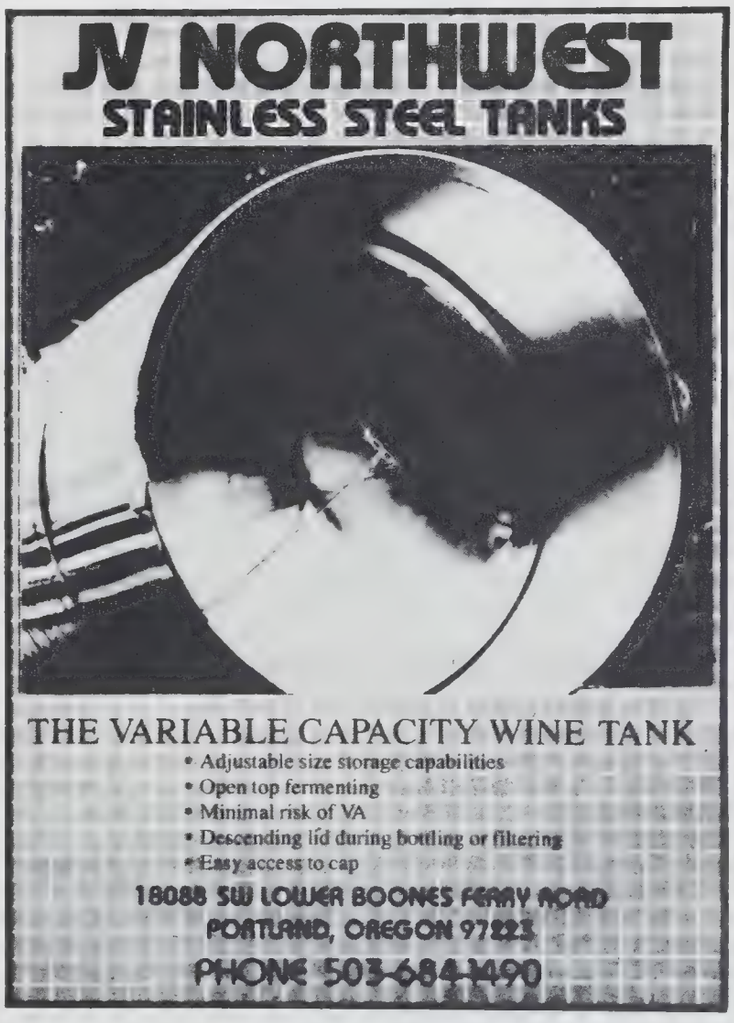
Tin-Lead

Stock capsules for stein finish bottles are 27.5mm X 50mm with separator rings. Colors are black matte, burgundy, black gloss, gold, light green, dark green, red flor, red gloss, white, or silver in minimum orders of 1,500.

Stock capsules for metric finish bottles are 28mm X 29.7mm and in lengths of 45mm, 50mm or 55mm, with separator rings. Colors are burgundy, black matte, brown, cream, light green, dark green, gold, white, orange gloss, or orange matte in minimum orders of 1,500.

Custom orders are available in any size and in color matches up to four, with or without separator rings. Side print and top print, or top embossment, are available. The minimum order is 20,000 and delivery requires 12-16 weeks.

Inquiries to Wine Industry Supplies, 49 Port Rd, Thebarton, S.Australia 5031; Phone: (08) 352-1355; Telex: AA82362


JV NORTHWEST
STAINLESS STEEL TANKS
THE VARIABLE CAPACITY WINE TANK
• Adjustable size storage capabilities
• Open top fermenting
• Minimal risk of VA
• Descending lid during bottling or filtering
• Easy access to cap
18088 SW LOWER BOONES FERRY ROAD
PORTLAND, OREGON 97223
PHONE 503-684-1490

Burgundian Viticulture

Don Blackburn

Continued from January/February 1985, p. 47.

SOILS

Over the years, Burgundian researchers have amassed a wealth of data concerning their soils and have determined which elements are in high proportion in the finest vineyards. Their understanding of these factors is not, however, such that they can readily extrapolate these conclusions for other regions. The following information can, nevertheless, be instructive, and can offer a valuable perspective.

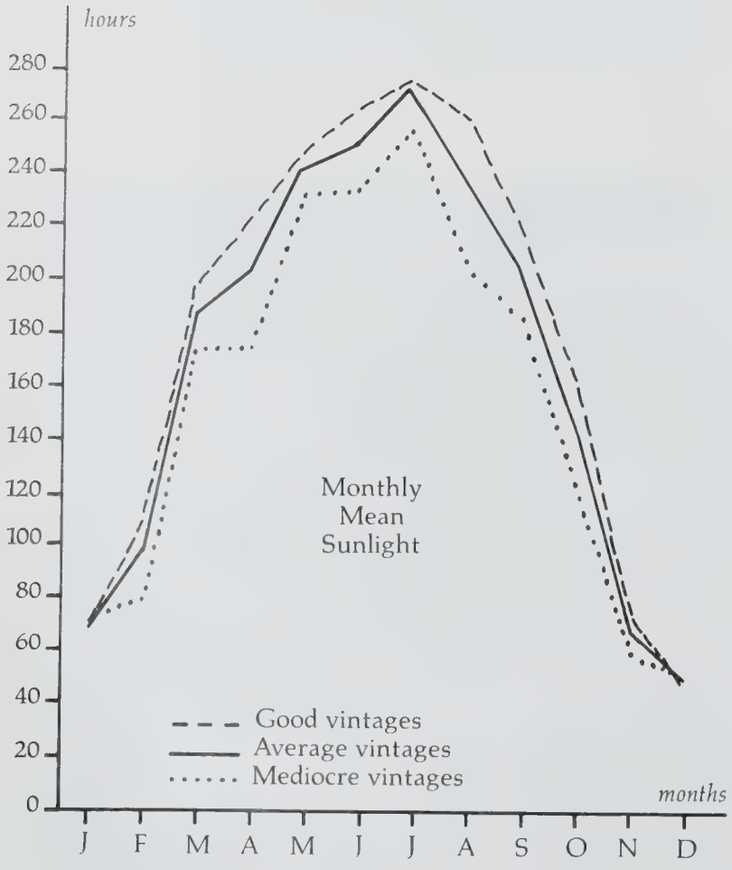
The viticultural soils of Côte d'Or are relatively similar to each other in nature, but small variations are quite significant. Walking through the vineyards, one notices abrupt changes in soil make-up, giving the impression of a mosaic.

The geological formations underlying the vineyards of Côte d'Or are sedimentary in origin. They were formed during the Jurassic Period in the middle of the Mesozoic (Secondary) era. The term 'limestone' used to describe these strata refers not to a single, specific rock type, but rather to a group comprising a variety of physical and chemical natures.

Côte d'Or is rich in calcite limestone ($CaCO_3$), as opposed to dolomite ($CaMg(CO_3)2$), siderite ($FeCO_3$) or magnesite ($MgCO_3$).

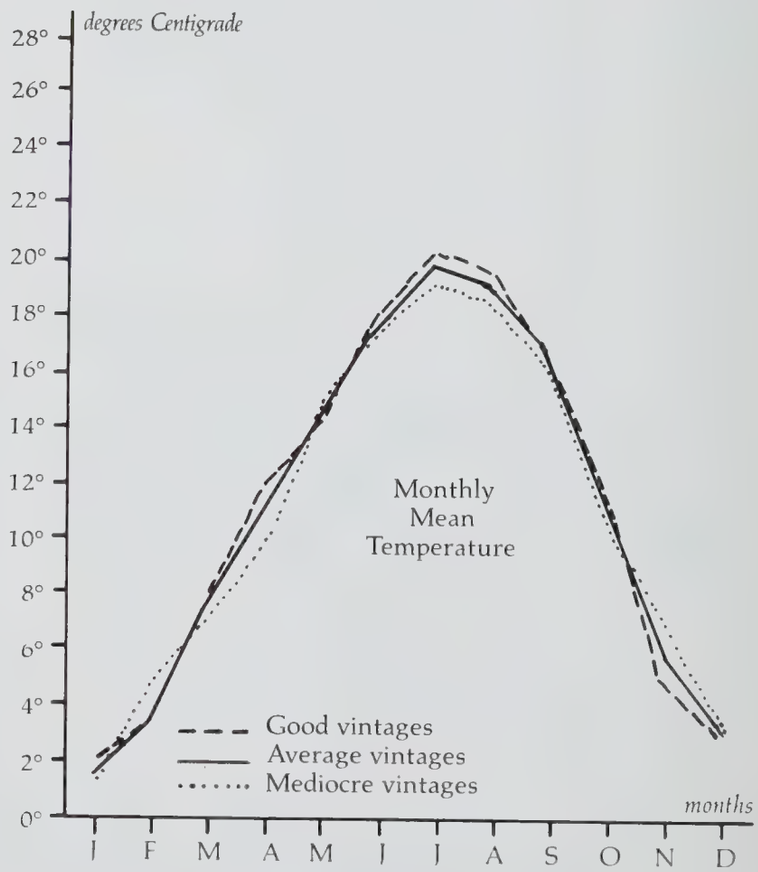
Limestones are composed mainly of calcareous sediments. The older limestones tend to be the richest in calcite. Depending on the circumstances of their formation, these strata contain varying amounts of non-calcareous material: clay, quartz, and sand. These impurities become viticulturally significant as they weather out of the limestone.

Marlstone is a friable (crumbly) mixture of silt and clay-sized grains of carbonate and clay minerals. The main carbonate is clacite, composing 30-70%. The abundance of marlstone in the Côte de Beaune is a major geological trait distinguishing it from the Côte de Nuits, where hard limestone is more common. The



Mean Duration of Sunlight

Monthly statistics, more than those for the whole season, signal at which moment of the evolution the climatic advantages essential to successful vintages occur. For example, sunlight data show a large variation between good years and medicore years for the months of August and September, and especially for April and June. (see graph) Data for May and July, on the other hand, show little linkage with wine quality.



Mean Temperature

Monthly temperature figures show quality-linked variations for April (importance of bud break), even greater in July and August, while less in September and October.

range of limestones found in France is much broader than this simple distinction would indicate.

The names of the different types refer to their ages. For example, Chablis' vineyards are located on outcroppings of Kimmeridgian limestone. Burgundian strata are among the upper Jurassic formations. It is worth our noting in passing that the Chablis appellation has been traditionally linked to the Kimmeridgian limestone, and it took all the moneyed interests of the modern world to get the appellation extended into the hitherto disdained Portlandian limestones.

Vineyards in Côte d'Or are largely on Argovian, Bathonian and Bajocian strata. The younger Kimmeridgian, which should cover them, is inexistent in the Côte de Beaune and Côte de Nuits. Each of these different limestones, because of its different calcareous and non-calcareous constitution, and because of its own resistance to weathering, has an immense influence on the topography and soil at its surface.

The term 'Cote d'Or' is generally felt to mean 'slope of gold'. This refers to the color of the vineyards when the leaves turn colors in autumn. (The term 'Gold Coast' is an erroneous translation.) Another theory holds that the real origin is 'Côte d'Orient', the 'East-Facing Slope'. This is, in fact, more descriptive of this particular slope in that vineyards around the world turn bright colors in autumn, but they don't all face east.

The slope is mostly gentle, attaining 15-20% on some of the upper parts. Many of these areas are uncultivated because of the lack of soil. Vineyards encroaching on these borderline areas often bear names attesting to their rocky nature: 'Les Perrieres', 'Les Chaillots'. Further downhill, the limestone is covered with an increasingly deep thickness of calcareous debris and clay accumulated through long-term erosion.

Mid-slope, where the topsoil still contains an abundance of calcite stones, one encounters the vast majority of Burgundy's Grands Crus. At the foot of the slope, near the railroad tracks, the calcite is all but absent. The only wines authorized for these vineyards are those bearing the regional appellations. Below the railroad track, A.O.C. wines are generally prohibited. Aside from the soil issue, it is felt that where the slope falls below 3% in Côte d'Or, the location is no longer suitable for viticulture.

Soil Structure and Texture

The presence of stones at the soil surface has several roles. It helps warm the soil by storing heat during the day and radiating it at night. When abundant, stones can offer protection against evaporation during droughts. When small stones (2-10 mm) are present to a depth of 30-50 cm, they help water evacuation. These benefits were so well-known to past generations of vignerons that a number of viticultural manuals discouraged the practice of 'destoning' vineyards beyond the absolute necessity.

French researchers have long measured the percentage of pebbles in the soil. They have found a large variation in the finest vineyards—10-30%. Within the Chambertin, the variability is from 30% in the upper part to 10% in the middle to 20% at the bottom. Also, it turns out that quality can come from vineyards at or below the 10% lower extreme; *e.g.* Batard Montrachet, Clos da la Roche, and Clos St Denis. The latter apparently makes up for its lack of pebbles by an abundance of larger stones, constituting 36% of its soil.

'Texture' refers to the distribution of particle sizes, *i.e.* the proportions of sand, silt, and clay. Of these three, clay has the greatest viticultural importance in Burgundy. Clay is valuable to vine nutrition, although in excess, it is hostile to the vine. Growers in the 19th century were aware that deep clay soils constituted 'wine wells' for Gamay and Melon, but could only produce ordinary wine regardless of the variety planted.

The upper quality limit of clay in these limestone soils is difficult to determine. Soil samples taken at a depth of 30-40 cm indicate that fine Burgundies come from soils containing 30-50% clay. The finest wines are distributed throughout this range. At either extreme, the quality of individual soils is a function of factors which correct for the apparent excess or lack of clay. (Clay-laden soils would have to benefit from another factor facilitating water evacuation, whereas a clay-poor soil might draw on a silt constituent to preclude a nutrient deficiency.) Soils which lack clay are felt to produce wines with finesse, but without body or ageing potential.

Côte de Beaune, on the whole, has less clay than the Côte de Nuits. The Grand Cru clay levels in the Côte de Beaune appear to average around 30-35%, whereas the Côte de Nuits average is about 40%. This distinction may explain in part the concentration of Chardonnay in Côte de Beaune. To stress the existence of exceptions, I should point out that Bâtard Montrachet, in the Côte de Beaune, has a slightly higher clay content than Musigny, in the Côte de Nuits: 50% against 45%.

GROSKOPF WAREHOUSE

P.O. BOX 128, VINEBURG, CA 95487
20580 8TH STREET EAST, SONOMA, CA 95487
(707) 996-2113 • (800) 221-0229

A 107,000 square foot wine storage and distribution facility easily accessible from all California wine producing areas, main intrastate and interstate highways, and the San Francisco bay area.

- Bonded wine cellar No. 5147.
- Fully insulated/temperature controlled (60°F. mean temperature).
- Truck level loading dock and ground level doors which facilitate the loading and/or unloading of flatbeds inside the building.
- Bonded and tax-paid wine storage and distribution.
- Tax-paid distilled spirits storage and distribution.
- Empty glass and packing spirits materials storage.
- Computerized inventory control and reporting.
- ABC and BATF experienced staff.
- Interstate and intrastate shipment consolidations.
- Import containers drayage and trucking services.

Soil Composition

Organic nitrogen in Burgundian soils increases from the top to the bottom of the slope. This is more the result of erosion than the soil nature as such. Localized variations are not meaningful in relation to appellation rank. Nor do individual vineyards have homogenous nitrogen concentrations. Chambertin varies between 0.08-0.15% over its 70 acres. It goes without saying that these background levels are augmented by mineral fertilization.

As if to confirm the long-held viticultural conviction, studies have shown that the Grand Cru soils, especially the reds, are relatively rich in phosphoric acid. Famous vineyards such as Pommard-Rugiens, Clos St Denis, and Chambertin (lower part) have phosphoric acid levels between 7 and 22 mg/kg. The white Grand Crus have lesser amounts: *e.g.* Corton Charlemagne and Montrachet: 3-5 mg/kg.

No statistical link has been found between wine quality and soil concentrations of magnesium, potassium, or sodium. Magnesium plays a role in photosynthesis and is quite variable, even within a given vineyard. It can be said that Grand Crus levels are above the regional average: 8-16 meq. (milliequivalents)/100 kg in the Chambertin, 10-20 meq./100 kg in Clos St. Denis and Clos de la Roche, as well as almost all the famous growths. The Musigny is lower, at 4 meq./kg This element cannot, however, serve by itself as a quality criterion, because some vineyards at the foot of the slope, as well as some bottomland pastures, have high levels.

Potassium, which is influential both in vigor and sugar production, has served extensively and intensively as a soil amendment in Côte d'Or in the last 20 years. Researchers now suspect that, in many cases, potassium assimilation has gone beyond a beneficial degree, to the point of raising wine pH. Unplanted viticultural-soils average 3-4 meq./kg of potassium, whereas many vineyards have well over 10 meq./100 kg. Upper slope vineyards either receive less or retain less at assimilable depths, averaging 5-6 meq./kg. It is noteworthy that the highest levels are found in vineyards which produce full-bodied reds, especially in the Côte de Nuits.

Sodium level has no known qualitative significance, varying from .6-3.9 meq./kg, averaging around 1 meq./kg. Interestingly though, samples taken in some of the finest Chardonnay vineyards, notably Meursault-Perrieres and Montrachet, yielded sodium levels near 3 meq./kg, well above the regional average.

Being so typical of Burgundian soils, calcium deserves special attention. According to Madame Rolande Gadille, whose monumental Burgundian research in the 1960's should inspire similar works in applied science for other regions, "It appears that the presence of calcite permits the fine Burgundian varieties (Pinot Noir and Chardonnay) to achieve their greatest success, but it is practically impossible to determine the optimum concentration."

The calcareous component of the soil is expressed in several ways. The Bertrand Calcimeter measures the total amount of $CaCO_3$. This is considered of limited value because only a part of this interacts with the vine. The Drouineau-Galet method reflects the active fraction. It measures the calcite which is soluble in carbonic acid (H_2CO_3). The *calcaire actif* is not directly proportional to the total $CaCO_3$. In the comparison of soils it serves as a scale. In Burgundy, it is an essential element in the choice of rootstocks, because of their different calcium tolerances.

Though the *calcaire actif* level generally diminishes with decreasing elevation, one can encounter high levels in mid-slope or lower mid-slope vineyards. In the Chambertin, for example, veins of high-carbonate soils are found either near the surface or in the subsoil. In that low-calcite spots are also common, one can say that the calcareous gradient from top to bottom is merely a generality.

Anomalies are explainable by topography and the varying weatherability of different limestone strata. High quality seems thus to coincide with a wide range of *calcaire actif*. The lower limit is felt to be 1%, whereas the only known upper limit is the calcium-tolerance of locally suitable rootstocks.

High levels of calcite are found in the marlstones and marly limestones of the Côte de Beaune, as well as in the friable limestones in some areas of the Côte de Nuits. Because of this stratum distribution, the Côte de Beaune has a generally higher level of *calcaire actif* than the Côte de Nuits. The upper part of the Montrachet averages 11%; the Corton, 10%.

Many soils producing communal appellations and Premiers Crus have *calcaire actif* levels between 2-5%. On the other hand, some Grands Crus, both red and white, have lower levels than this: Musigny, 1-1.5%, Bâtard-Montrachet, 1.5%. (The total $CaCO_3$ levels are higher.) Some high calcite areas such as Corgoloin make no wines above regional appellation—'Bourgogne'.

Thus, while this scale is worth noting because it is part of Burgundian thinking, it is not a direct barometer of quality. The conclusion to this section on the calcareous soil component becomes evident: Pinot Noir and Chardonnay do well in soils rich in calcite, but we don't know why. We, therefore,

Indexing Physical Site Data

Madame Rolande Gadille has established a Topo-Pedological Index (I_{tp}), which combines the main pedological factors (soil depth and texture) and the primary topographical factor (slope) for a given site. This coefficient is intended to describe the physical conditions apt to influence vine growth and grape maturity.

I_{tp} = (% clay) X (soil depth)
(% stones) X (% slope)

The stone content reflects only the 2-10 mm range. Soil depth is expressed as: 1 for soils of 0-30 cms; 2 for soils of 30-60 cms; 3 for soils of greater than 60 cms.

The Topo-Pedological Index, specific in its application, does not attempt to address such factors as carbonate concentration or exposition. The index varies from a low where hillside conditions favor the denominator, to a high where numerator values are great at the foot of the slope.

VALUES

0.15-0.20 — thin, poor soils on unweathered limestone strata at the top of the slope. These soils are called 'rendzinas'.

0.15-0.25 — rocky, calcareous soils on limestone debris on the upper slope.

0.25-0.40 — 'Brown calcareous' soils (some rocks, some clay) at mid-slope.

0.40-2.0 — 'Brown calcareous' soils at lower midslope.

2.0-5.0 — 'Brown clay-calcareous' soils on the lower slope.

10.0-20.0 — Clay-silts on the plain of the Saone River. The finest vineyards tend to be located on lower-mid or mid-slope. Other good vineyards are found on the upper and lower slopes. The top of the slope is generally left to pines and shrubs, whereas the plain of the Saone River is limited to grazing and cereal production. It appears that the optimum for red wine in the Côte de Beaune (0.3-1.5) is lower than that for the Côte de Nuits (0.6-2.0). The finest whites break into two categories: those on the upper half of the slope (0.25-0.35) and those at mid-slope (1.2-2.0) or even 3.0 where micro-climate anomalies intervene.

The following vineyards have been indexed:

Côte de Beaune	*Côte de Nuits*
0.22 Corton	0.6 Musigny
0.25 Corton-Charlemagne	1.5 Clos de la Roche
0.25 Meursault Perrières	1.9 Clos St. Denis
0.35 Chevalier-Montrachet	0.14 Upper Chambertin
0.50 Montrachet	0.2 Middle Chambertin
1.0 Meursault-Charmes	0.57 Lower Chambertin
4.6 Bâtard-Montrachet	

cannot determine their complete calcium carbonate requirements. The conviction that these two varieties need limestone is based on the impressive but circumstantial evidence of French experience. Total iron in the ferruginous soils of Côte d'Or ranges from 7-12%. In lower iron soils it constitutes 3-5% by weight. Free iron is 30-40% of these levels.

Trace Elements

Analysis of trace elements of a Chardonnay leaf from a Côte de Beaune vineyard showed a dominance of manganese, followed by copper, then strontium. These were followed by titanium, lead, tin and then others in tiny amounts. Most soil analyses reveal manganese as the major trace element, although, in a few cases, it was surpassed by strontium or barium. (Manganese also tends to be the major trace element in Burgundy wine.)

Its soil concentration varies in Côte d'Or from 230 to over 2,000 ppm. This element is somewhat evenly distributed throughout the region, showing a variation according to slope. While it cannot serve by itself as a criterion for vineyard quality, it so happens that all slopes whose manganese concentration exceeds 1,000 ppm yield famous wines. It does not follow that areas low in manganese are excluded from fine wine production.

Lead levels vary from 20-70 ppm, although several vineyards show anomalies as high as 500 ppm, without the proximity of manmade pollution sources. Grand Crus vineyards generally have 10-20 ppm. Gallium varies between 3-120 ppm. Averaging 10-20 ppm, it is high (30-60) in Meurault and Puligny (the center of the Chardonnay area). Beryllium is also higher than average in these two towns, 4 ppm against 1 ppm.

Molybdenum appears to be efficiently assimilated by the vine. It appears that when it is in low concentration, the vine shifts its attention to vanadium, which generally ranges from 75 to 350 ppm. Tin averages about 10 ppm, cobalt varies between 10-30, nickel between 10-100, chromium between 60-300.

Trace element assimilation varies with soil make-up. Studies show that the thin calcite soils at the top of the slope and the brown calcite soils of the mid-slope yield their trace elements less readily to the vine than do the richer soils further downslope. Tests taken over the last 20 years show a disparity in the utilization of trace elements in the soil. Barium and rubidium, among the most abundant in the soil, barely appear in vine leaves.

On the other hand, magnesium and strontium seem to be used preferentially. Strontium is extremely abundant in some parts of the northern Côte de Nuits (1,000 ppm), yet its abundance in Pinot Noir in those vineyards was found to be inferior to its concentration in Chardonnay vines from Côte de Beaune vineyards with only 50 ppm in the soil. Here we encounter the dual variables of varietal capacity for assimilation and the soil's ability to render the element available to the vine.

Over the last 15 years, foliar spraying with certain trace elements showed good results in correcting physiological imbalances within the vine. Yet on a more comprehensive level, little work has been done on the influence of the individual trace elements of wine quality.

Existing information leads to a number of conclusions concerning trace elements in Burgundian soils: 1) levels are rarely related to a particular soil type, 2) levels are, to the contrary, relatively constant on a given slope, 3) determination of the enological role of individual trace elements is made quite difficult by the soil's tendency to maximize or minimize degree of assimilability and by the vine's preference for some elements over others, and 4) complexity of the role these elements play in the tortuous pathway into the wine bottle remains a daunting unknown to scientists.

Most Grands Crus, especially the reds, are attributable to soils 'richer' than those which, in the same vicinity, produce inferior wines. In the framework of this viticultural region, one concludes that soils with lesser offerings of the entire array of beneficial nutrients tend to yield wines which lack body. Such a wine may be delicate, but its bouquet would tend to fade rapidly. It does seem, though, that Chardonnay has a lower adequate fertility threshold than Pinot Noir.

It should be stated that this notion of fertility requirement does not contradict long-held conviction that vines need a relatively poor soil. The critical point here is that the vine cannot benefit from a high nitrogen concentration, nor from a soil which retains water. The vine does have diverse nutritional requirements, so soils which offer only a limited range of assimilable constituents will yield wines of stilted dimensions.

Soil Types

The plateau at the top of the Côte d'Or is not generally planted to vineyards, but its soils are of interest to us. A common type of soil is a skeletal *rendzina* directly on hard limestone. It is usually only several mm thick. It has a high proportion of iron, 50-60% clay, and 0.5% humus. Its pH is about 6.5, which is more acid than the viticultural soils. Plateau *rendzinas* on marlstone or marly limestone have a different constitution. They are thicker because of the greater weatherability of the underlying strata. They are still quite thin, 5-6 cm. The abundance of $CaCO_3$ gives a pH of about 8, which is similar to viticultural soils.

THE WINE INVESTOR

The most authoritative and informative newsletter in the world of wine is available in two editions:

THE WINE INVESTOR / EXECUTIVE EDITION is published twice a month for producers, shippers, importers, growers, distributors, wholesalers, institutional and private investors, bankers, accountants, lawyers, business writers, equipment manufacturers, and others whose financial interest in wine requires up-to-the-minute coverage of the industry. It features in-depth stories on marketing, legal matters, and industry trends.

THE WINE INVESTOR / BUYER'S GUIDE is published monthly for retailers, restaurateurs, and consumers. It surveys wine markets from the buyer's point-of-view and recommends wines for immediate consumption or profitable inventorying.

The 1985 SPARKLING WINES REPORT will be available very soon! It presents the most in-depth analysis of case-sales of imports and American brands; price considerations, and consumer-segments.

TO ORDER YOUR SUBSCRIPTION:

Executive Edition (24 issues) and Buyer's Guide (12 issues) $225/year
Executive Edition (24 issues/year) only, $195
Buyer's Guide (12 issues/year) only, $60
1985 Sparkling Wines Report, $100
Please send funds and business card to:

THE WINE INVESTOR (Dept. WIPW)
6515 Sunset Blvd., Los Angeles, CA 90028

Sampling of the soils on the slope is only representative if it is carried out in locations which receive no amendments. 'Thin calcite soils' of the upper third of the slope are 1545 cm thick. They are very well-drained both because of the slope and their abundance of 2-20 mm stones comprising at least 30% of the topsoil. The remaining 70% is divided into 25-35% clay, 20-40% sand, and 20-30% silt. This soil type is poor in potassium and phosphoric acid. Its pH varies from 7.7 to 8.4 and the slope between 10-20%.

'Brown calcite soil' is located farther downhill. It covers the middle and lower thirds of the slope. It is the principle producer of the finer wines. Its thickness increases from 40 cm at the upper mid-slope to one meter in the lower slope. It is composed of 15-30% stones, 30-40% clay, 30-35% silt and some sand. Its pH is 8.0-8.2.

Unlike the soils on the upper slope, it has two horizons. The upper is 25 cm thick, brown in color, and crumbly. The lower horizon is 15-75 cm thick. Its color is reddish, resulting from an abundance of iron. Its viticultural aptitude is associated with 1) its balance of proper drainage and adequate moisture retention, and 2) its wide range of assimilable nutrients without an overabundance of nitrogen.

It should be stressed that these soil types serve as descriptors rather than as a listing of soil make-ups. These several types are averages around which there exist families of diverse nature.

Sub-Soil

Delving into accounts written by leading viticulturists of past generations offers some insight into the influence of subsoil. Perhaps 19th century growers were less afraid than we to draw conclusions from sketchy information. Perhaps they saw with a clarity unobscured by the modern insistence on concrete data. Or perhaps they simply made valid conclusions which we have not yet gotten around to confirming. (Perhaps they were just mistaken.)

E. Durand and J. Guichard gave the following conclusions in 1896. They found that superior Bathonian strata yield red or brown soils rich in potassium and phosphoric acid, with very few stones, and producing full-bodied wines. Oxfordian marlstone covered with very stony soil yields wines with an intense bouquet thanks to its richness in calcite and potassium. Oxfordian marly-limestone is best suited to white varieties, because of their lesser need for assimilable elements.

In the early 1900's, P. Pacottet stressed the importance of the soil's iron in giving the grape adequate anthocyanins for the wine's color intensity. He attributed a wine's bouquet to calcite. He also felt that this same soil component limited the wine's body. He further concluded that magnesium acted as a 'harmonizer' for a wine's various organoleptic equilibria.

These affirmations, apparently ambitious, give us a feel for the traditional view of sub-soil as a quality factor. These impressions are definitely worthy of our attention; after all, none of Burgundy's finest vineyards have been discovered since these long-dead vignerons took the time to write down their observations.

We should bear in mind that the soils in which hillside vineyards grow do not originate in the weathering rock beneath them, but from the weathering rock farther uphill. While vine roots plunge far into the soil and sub-soil, the majority of nutrient uptake is limited to the zone in which most of the rootlets grow.

Roots have difficulty growing into the hardest limestone, whereas they follow clay-filled fractures in marly limestone and can even penetrate right into the readily disintegrating marlstone. These distinctions influence the soil directly, most obviously through water retention and evacuation.

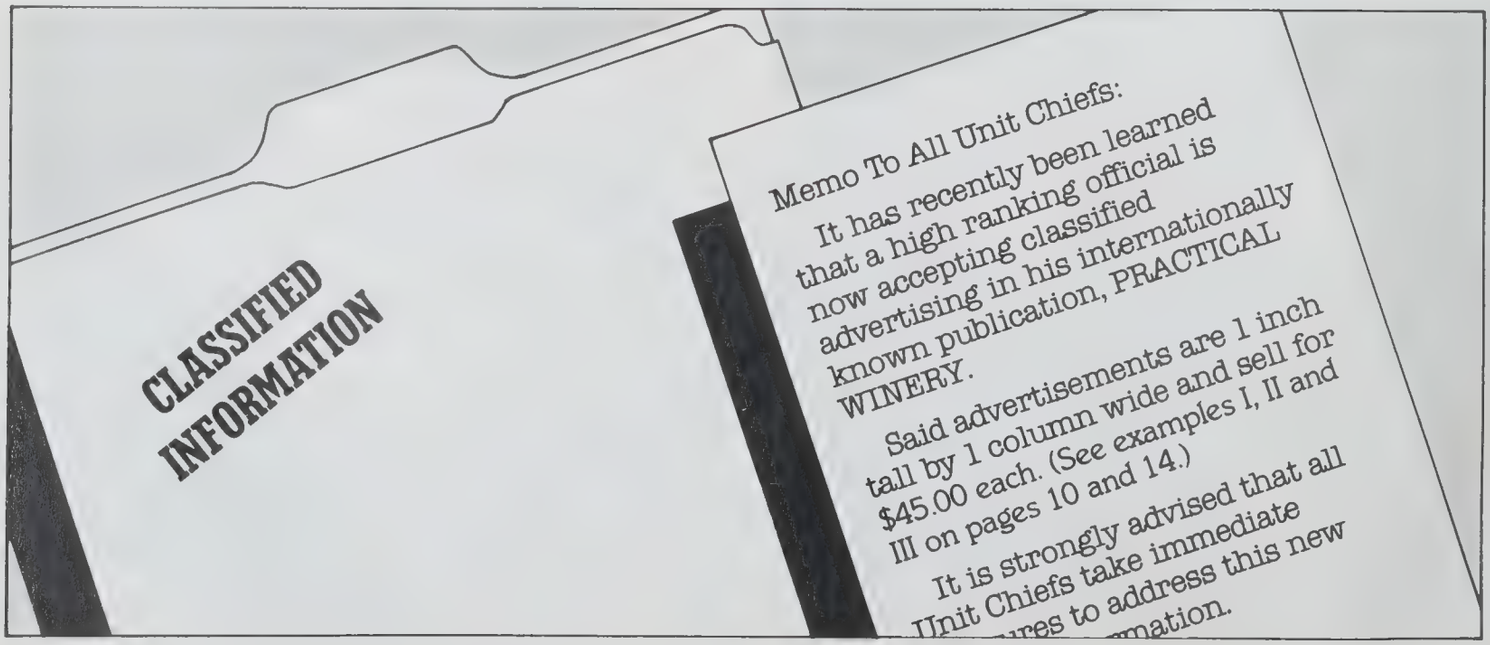
It is felt that the location of the Grand Cru vineyard on a given slope is related to the mid-point, the optimum, of the permeability spectrum from the top to the bottom of the slope. In that a hallmark of a Grand Cru is its consistency in outperforming its neighbors, much importance is attached to that ideal spot on the slope where water retention is adequate in droughts, and evacuation is assured in wet periods.

The ideal permeability point is found on the upper slope in some areas and the mid or lower in others. No single figure or function establishes this point for all Grands Crus because we don't know how much weight to give a permeability coefficient in relationship to clay content, *calcaire actif*, strontium, iron, exposition, etc. For the moment, the 'permeability coefficient' remains a figment of my imagination.

Erosion

Erosion has always been a major enemy of the soils of Côte d'Or. Studies of soils in steep vineyards in Beaune, Pommard, and Aloxe-Corton showed ten-year erosion losses of 8-10 cm.

continued on page 90


CLASSIFIED INFORMATION
Memo To All Unit Chiefs:
It has recently been learned that a high ranking official is now accepting classified advertising in his internationally known publication, PRACTICAL WINERY.
Said advertisements are 1 inch tall by 1 column wide and sell for $45.00 each. (See examples I, II and III on pages 10 and 14.)
It is strongly advised that all Unit Chiefs take immediate

How to Order a Wine Tank

Don Jones

The following is a chart to help the winemaker assess his needs and design his tanks. Careful design consideration will eliminate costly changes, will ease price comparison when shopping, and will help pin down all the options.

Gallons needed: _____ *per tank*

Number of tanks needed: _____

Desired height: _____

Height restrictions: _____

Diameter restrictions: _____

Top configuration: _____

Top Configuration

conical truncated floating dished

Top Manways: _____
(6", 10", 18", 20", 24" outswing/sidewswing)

Manway location: ____ center

chimney: ____ front, ____ side, ____ back

truncated: ____ front, ____ side, ____ back

Top vent: ____ 2", ____ 4" ____ 2" vacuum pressure release valve
(diameter of vent should equal or exceed drain diameter.)

other:_____

vent location: ____ manway door, ____ center top

other: _____

Top Manway Location

center top chimney truncated

front = side = back front = side = back

Bottom configuration:

____ sloping (standard slope is ¾" per foot)

____ conical

____ dished

Bottom Configuration

sloping conical dished

Sidewall manways:

____ 18" outswing at bottom

____ 18" outswing and 16" x 20" or 22" inswing at side

____ 16" x 20" or 22" inswing at side

Legs-base:

____ stainless steel polished legs, adjustable leg pockets

____ mild-steel painted legs, adjustable leg pockets

____ mild-steel base

____ stainless steel angle legs

____ mild-steel angle legs

Racking port: _____ *(type and size)*
flange / npt / sanitary tri-clamp / other (specify)

location: height usually 10% of height of tank unless otherwise specified: _____

____ right or left of manway

____ straight-out or angled down 15°

____ facing-out or facing-front

Cooling jacket: _____ *(width in inches)*

____ channel glycol system

____ spiral channel glycol system

____ dimpled pressure jacket

____ split jackets

(individual widths and position on sidewall: _____)

optional:

____ weld valve directly to tank

____ rotating racking valve

____ gusset (bracing)

Drain: _____ *(type and size)*

flange / npt / sanitary tri-clamp / other (specify) _____

Temperature well: _____ *(quantity)*

standard: 12" gusseted well with ½" half-coupling

add: thermometer: _____

add: temperature controller: _____

Sample coupling: _____

½" half-coupling or ½" sanitary fitting

other: _____

Eye level chart holder: _____

Material type: _____ 304-2B

_____ 304 polished

_____ 316-2B (less carbon in the steel than 304—more costly)

_____ 316 polished

Inside finish:

Welded and polished:

_____ m.i.g. (metal inert gas — wire feed welding)

_____ t.i.g. (tungston inert gas — fusing of 2 pieces of metal)

_____ Ground smooth and polished

Hold-down mechanism for Seismic Activity: _____

Factory installed insulation: _____

Lifting apparatus for floating lid: _____

Delivery date requirements: _____

Other specification: _____

Quote Option:

a) FOB factory plus sales tax
b) FOB winery plus sales tax
c) Set in place, not anchored including sales tax
d) Installed—set and anchored including sales tax

Don Jones is president of JV Northwest Engineering, manufacturer of stainless steel wine tanks, located at 18088 SW Lower Boones Ferry Road, Portland, Oregon (503) 684-1490.

Burgundian Viticulture *continued from page 88*

Some steep vineyards in Aloxe have no more than 15 cm of soil despite the efforts at soil retention.

As in Alsace and the northern Rhone Valley, Burgundian growers have traditionally transported eroded soil from the bottom of their vineyards up to the top. This is now done with specially equipped tractors, but vignerons used to carry the dirt in hods on their backs. Even with modern methods, it is an expensive operation. Moreover, much of the soil is carried into gullies and thus definitively lost. For this reason, the addition of soils from other locations is an accepted practice.

This *terrage* was carried out before the advent of mineral fertilizer in the 20th century, and before the use of manure, which began around 1850. (Until the mid-19th century, growers feared that manure addition would give off-flavors to the wine.) Famous vineyards such as La Romanée Conti received substantial soil additions in the 18th century. The major quality criteria, then as now, was the origin of the transported dirt. Some growers took soil from the plateau above the vineyards, while others brought in black 'cabbage soils' from the plain of the Saone River.

In the 18th century, Pezerolle de Monjeu denounced the use of fertile soils intended not to replace losses, but to increase the vineyard's yield. "This soil, neither red nor friable, is recognizable 30 years later, because of its coal-color," wrote de Monjeu.

This discussion of habitat is intended as a presentation of the basic parameters. If vintners in the New World are to benefit fully from the extensive research covering French viticultural habitat, they must be willing to invest money and manpower in: 1) examination of French data, 2) translation of relevant works, and 3) development of applications to other regions. This will require researchers with knowledge of climatology, geology, pedology (soils), viticulture, and enology. Interdisciplinary groups composed of specialists could make much more meaningful contributions than even the most enthusiastic individual.

If wine quality is to be served by such an endeavor, the starting point and the connecting thread must be a love and a mature appreciation of wine by all participants. The technological side of progress need not be the only goal. It would receive plentiful benefit in any case.

REFERENCES

Angot, A. 'Etude sur les Vendanges en France' *Annales du Bureau Meterologique de France* p.39 1883.

Branas, J., Bernon, G. & Levadoux, L. 'Elements de Viticulture Generale' *Montpellier* p.71 1946.

Buckman, H. & Brady, N. *The Nature and Properties of Soils* p.371,623.

Durand, E. & Guichard, J. *La Culture de la Vigne en Cote d'Or* Dijon 1902 p.21-23,84-86.

Fairbridge & Bourgeois, eds. *Encyclopedia of Sedimentology* p.432-443, 510-517 1978.

Gadille, R. 'Vignoble de la Cote Bourguignonne' *Publications de l'Universite de Dijon* p.74-108, 310339, 344-345, 316, 24, 27 1967.

Geslin, H. *Les Facteurs Climatiques de la Qualite* Paris 1935 p.208.

Guyot, E. & Godet, C. 'Le Climat de la Vigne', *Annuaire Agricole de la Suisse, 1er Fascicule* p.17-64 1935.

Huglin, P. 'Recherches sur les Bourgeons de la Vigne' I.N.R.A., Strasbourg p.9 1958.

Leneuf, N. 'Influence des Sols sur la Qualite des Produits' Institut des Sciences de la Terre, Universite de Dijon p.6-8 1984.

Meriaux, S., Plantier, M. & Meriaux M. 'Erosion et Lutte Contre l'Erosion dans le Vignoble de la Cote de Beaune' 5e Congres International du Genie Rural p.25 1958.

Meriaux, S., Chretien, J., Vermi, P. & Leneuf, N. 'La Cote Viticole. Ses Sols et ses Crus' *Bull. Sci. Bourg.* p.19, 24-25, 28-30 1981.

Pacottet, P. *Viticulture* Paris 1905 p.65.

Tainturier, A. 'Cultures des Vignes de Beaune et des Lieux Circonvoisins' Manuscript of the Bibliotheque Municipale de Beaune p.129 1763.

Vergnette-Lamotte, A. de *Le Vin* 2e edition Paris 1868 p.17.

Vergnette-Lamotte, A. de *Memoire sur la Viticulture et l'Oenologie de la Cote d'Or* Dijon 1846 p.47-49.

Vigneaux, M. & Leneuf, N. 'Geologie et Vins de France' *Bulletin de l'Institut de Geologie du Bassin d'Aquitaine Paris* p.230 1980.

PRACTICAL WINERY LIBRARY

PRACTICAL WINERY *is based on useful articles and comment which are never outdated. We have the pleasure of offering the following back issues at a cost of $5 per copy.*

VOLUME I, NO. 1
Calera Winery (CA) • Carneros Creek Winery (CA) • Sugar Determination Via Rebline Method • Building a DeJuicer • Maintaining Refrigeration Efficiency

VOLUME I, NO. 2
Santa Cruz Mtn Vineyards (CA) • Edmeades Vineyards (CA) • SO_2 via Iodide-Iodate • Filtration, Depth, Crossflow • Polyethylene Tanks • Energy Saving at Robert Pecota Winery (CA)

VOLUME I, NO. 3
SO_2 via Ripper Method & Platinum Electrode • Lawrence Winery (CA) • Tartrate Stability

VOLUME I, NO. 4
McDowell Valley Vineyards (CA) • Enzymatic Wine Analysis • Acid Reduction

VOLUME I, NO. 5
Custom Cooperage • Pumps • Liquid SO_2 • Nouveau Production History

VOLUME I, NO. 6
Rico's Winery (New Mexico) • Fining Wines in 1888

VOLUME II, NO. 1
Ventana Vineyards (CA) • Depth Filtration, Part I • Filter Media Cross Reference Chart • Wine Filtration • Centrifuges

VOLUME II, NO. 2
Moon Valley Circuits' Computers • Depth Filtration, Part II • Elastomers • Tank Presses

VOLUME II, NO. 3
Santino Winery (CA) • Turner Winery (CA) • Hydrogen Sulfide • Plastics • Wastewater Cleanup with Water Hyacinths

VOLUME II, NO. 4
Cordtz Cellars (CA) • Fritz Cellars (CA) • Arroyo Sonoma Winery (CA) • Adler Fels Winery (CA)

VOLUME II, NO. 5
Tank Press Advantages • 1981 California Nouveau Production • Mobile Bottling Lines • Computers in California Wineries • Marketing: How Practical the Small Winery?

VOLUME II, NO. 6
Corks • Wastewater Disposal • Malolactic Fermentation • Silicone Barrel Bungs • Kenwood Winery (CA) Computer • Steel Barrel Racks

VOLUME III, NO. 1
Barrels • Winemaking Consultants • Chardonnay • Ridge Winery (CA) Computer • Lees Filter-Press • Independent Laboratories

VOLUME III, NO. 2
Barrel Shaving • Sauvignon Blanc • Insulated Tank Benefits • Secondary Closure Buyer's Guide • Variable Capacity Tanks

VOLUME III, NO. 3
Roto-Tanks • Refrigeration • Skin Contact Temperature Variation • Pinot Blanc • Fenn Valley Vineyards' (MI) Computer

VOLUME III, NO. 4
O'Enologist/Wayne Marcil • Malolactic Fermentation • Bottle Buyers' Guide • Bottle Manufacturing Quality • Used Bottle Supply • Fining Agents Buyer's Guide • Pinot Noir • Ahlstrom Redesigns Coq Cylinder

*** **VOLUME III, NO. 5**
New Membrane Presses • Must Chillers • Sonoma Cutrer (CA) Controls Grape Temperature • French & American Barrel Phenolic Extraction • Chenin Blanc • Bottle Cleaner Option • Buena Vista (CA) Pigeage Fermenter • Theories & Uses of Fining Agents • Modified Screw Press Reduces Wear • Parsons Creek Winery (CA) Crushes and Presses in Vineyard • Making a Winery Successful/F.Woods • Wine People and the Political Process/B.Firestone • Barrels & Wine-Oak Ageing of Sauvignon Blanc

VOLUME III, NO. 6
Fisher Winery (CA) Architectural Award • Fruit Winemaking • Commercial Sterilization of Wine Corks • Merlot • Refrigeration: Ammonia or Freon • Malolactic Fermentation • CO_2 Bottling System • Cakebread (CA) Improves Vineyard Drainage

VOLUME IV, NO. 1
Concannon Winery (CA) • Schramsberg Vineyards (CA) Expansion Equipment Reduces Phenolics • Chardonnay • Acacia Winery (CA) • pH and TA/Jim Vahl • Christian Bros. (CA) Techniques • DE, What is it? • Sterile Filter Myths & Fables • Plate/Frame Filter Equipment & Media • French Red Winemaking • Turner Winery (CA) Improves Bag-in-Box Quality • L.Martini Winery (CA) Cabernet Sauvignon Apellation Comparison

VOLUME IV, NO. 2
Yeast Buyer's Guide • New Filler Valve • Riesling: Grape Varieties and Wine Styles/W.Schug • Gewurztraminer • Pressure Leaf Filter Equipment • Hydralobe Pump • Autolysis at Vichon

VOLUME IV, NO. 3
Grape Prices • Grape Loss to Birds • Pigeage Tank • Sauvignon Blanc • Quail Ridge Winery (CA) • Energy Management • Tank Jacket Designs • Membrane/Cartridge Filters • Direct Expansion Refrigeration Systems • Price Discounting • Wine & Food/Elaine Bell

VOLUME IV, NO. 4
Prohibition • Merchandising • What is IN a Wine?/R.Peterson • Pinot Noir & Food/B.Lang • Use of French Oak at Sebastiani • Bubblical Sense/R.Smith • Pinot Noir • Sterile Bottling/R.S.Scott • Sluggish & Stuck Fermentations • Unique French Vathouse Design

VOLUME IV, NO. 5
Joseph Phelps Winery (CA) Computer • Wineries & Money • Strategy & Development of Clos du Bois (CA) • Individuality & Craftsmanship /B.Ramey • Howe to Score a Wine • Whole Berry Fermentation • Must/Wine pH Quality/R.Beelman • California's Fickle Grape Supply • French Techniques of Cap Management • Sources of Reinfection/ F.Neradt • Coping with Stuck Fermentations

VOLUME IV, NO. 6
Domestic Wine Market Growth • Time to Reconsider Wine-Marketing /M.Cliff • Vinification of Zinfandel at Ridge Winery (CA) • Stand Up for Zinfandel/R.Kozlowski • Wine Ageing in the Bottle/J.Meyer • Trumpetvine Wines Sell Zinfandel • Future for Biotechnology in Vineyard & Cellar? • Growers & Wineries Working Together/R.Phillips • Grower's Perspective on Chardonnay/R.Wicker • Hillside Irrigation /S.Soper • Maceration of Cabernet Sauvignon • Pennsylvania Pragmatism: Naylor Wine Cellars • California Inspection of Harvested Grapes

VOLUME V, NO. 1
Wine Inventory Quandry • Research Funds Essential • Stratford Winery (CA) • Applications of Pectinases • Designs/Options in Pump Selection • Howe to Buy Wine in a Restaurant • Riesling • Ask Your Food • Present Technology in Use of Malolactic Bacteria • Life Among the Malolactics/L.van der Water • SO_2—Limits of Our Understanding • Bentonite • Burgundian Chardonnay Production

VOLUME V, NO. 2
Determining Grape Maturity • Seyval • Monitoring Sugar Per Berry • Improving Accuracy of Crop Estimates • Economics of Producing Chardonnay in the Vineyard

VOLUME V, NO. 3
Elimination of Fermentation Inhibitors • Economics of Producing Chardonnay in the Winery • Tank Presses Replace Screw Presses at Inglenook (CA) • Wine Auctions: A View from the Rostrum/P.Grubb • Predicting Vineyard Yield • Shiraz/Syrah • Malolactic Bactera: Research & Applications • New Detection Method for Grape Defects • Burgundian Chardonnay Production-Part II

VOLUME V, NO.4
BATF Wants Your Comments • Bottle Price Formula: Panacea or Anachronism • Roguing Out Eutypa • Ultrafiltration • Acidity and pH Control • Sterile Filtration with Filter Sheets • Vines of Winery Lake • Winery Finance: Winery Valuation • Winery Water & Waste: Site Planning • Wine Lawyer: Legal Developments Affecting Pricing

VOLUME V, NO. 5
Howe to Competitively Judge Wines • BATF Laboratory Analysis Instruction • UC Davis Opens 50-ton Winery • Semillon • Improved Irrigation at Buena Vista • Chardonnay Suffers Freeze Damage • Potassium Balance in Vines • Burgundian Viticulture I • Winery Water & Waste: Winery Waste Recycling

VOLUME V, NO. 6
Grafting Techniques • Rapid Cold Stabilization • Purchasing a Wine Press • Benefits of Cover Crops • Archie Bunker VS. Baron Rothschild/ V.Singleton • Wine Lawyer: Distribution • Sources of Finance • Untreatability of Winery Wastewater

*** *Story Reprints* **only** *are available $1.00 each.*

SERVICES FOR GRAPEGROWERS & WINEMAKERS

Agri-Fab Industries/Vineyard Supplies, PO Box 536, Lodi, CA 95241 (209) 334-3560. B4, V2

Ahlstrom Machinery Inc., PO Box 74, Glen Falls, NY 12801 (518) 798-9541. P3, W3

American Fuji Seal, Inc., 1251 N. Blue Gum St., Dept. W, Anaheim, CA 92806 (714) 630-0450. S2

Anker Labelers Corp., Ark Road, R.D. 2, Mt. Holly, NJ 08060 (609) 261-1166. L4

Ashbrook-Simon-Hartley, PO Box 16327, Houston, TX 77222 (713) 449-0322. P1

Barrel Builders, 1085 Lodi Lane, St. Helena, CA 94574 (707) 963-7914. B2, B3, B6

Blake Printery, 2222 Beebee St., San Luis Obispo, CA 93401 (805) 543-6843. L3

Boswell Company, 36 Crane Dr., San Anselmo,CA 94960 (415) 457-3955. B2, B3

Burkhart Industrial Sales, 3654 W. Dry Creek Rd., Healdsburg, CA 95448 (707) 433-3265. P3

Calpac Container Co., 33359 Central Ave., Union City, CA 94587 (415) 471-5091. B8

Cellulo Co., Finer Filter Products Div., 124 M St., Fresno, CA 93721 (209) 485-2692; Cranford, NJ (201) 272-9400. D2, E2, F2, F3, F5, L1, T2, Y1

Chateau Bottlers, PO Box 2274, Napa, CA 94558 (707) 253-1254; 26 Woodland Ave., San Rafael, CA 94901 (415) 454-2355. M2

Cherokee Tank Lines, 5463 Cherokee Rd, Stockton, CA 95205 (209) 931-3573. T5

Cherry-Burrell Corp., 2400 6th St.SW, Cedar Rapids, IA 52406 (1-800) 553-8867. F6, P3, T1, V1

Joseph W. Ciatti Co., Inc., 42 Miller Ave., Mill Valley, CA 94941 (415) 388-8301. B12

The Compleat Winemaker, 1219 Main St., St. Helena, CA 94574 (707) 963-9681. B10, C2, C8, D1, F2, F6, H2, L4, L6, P1, P3, S1, S3, S4, T2, T4, V1

CPN Corp., 130 So. Buchanan Circle, Pacheco, CA 94553 (415) 687-6472. P2

Criveller Co., 6863 Lundy's Lane, Niagara Falls, ON., L2G 1V7 (416) 357-2930; PO Box 162, Lewiston, NY 14092. B10, E2, F2, F3, P3, Y1

Custom Cooperage, 1194 Maple Lane, Calistoga, CA 94515 (707) 942-6902. B2, B3, B6

Data Consulting Associates, Inc., 18000 Coleman Valley Rd, Occidental, CA 95465 (707) 874-3067. C5

Demptos Cooperage, 849 Jackson St., Napa, CA 94559 (707) 257-2628. B2

Eagle-Picher Industries, Inc., 580 Walnut St., Cincinnati, OH 45202 (513) 721-7010. D2

ENCORE!, 860 So. 19th St., Richmond, CA 94804 (415) 234-5670. B8, B11

ETS (Enological Technical Service), 1804 Main St., St. Helena, CA 94574 (707) 963-4806. L5, M1, Y1

Feldmeier Equipment, PO Box 178, Salina Station, Syracuse, NY 13208 (315) 424-1904. V1

Fischer & Schug Winery Equipment, 940 Dowdell Lane, PO Box 556, St. Helena, CA 94574 (707) 963-3169. B9, B10, B11, C1, C6, C7, C10, D1, F2, F6, H2, L2, L4, L6, P1, P2, P3, T3, T4, U1, V1

Genencor, Inc., 180 Kimball Way, S.San Francisco, CA 94080 (415) 588-3475. E2

Grefco Minerals, 3435 W. Lomita Blvd., Torrance, CA 90509 (213) 517-0700. D2

Groskopf Warehouse, PO Box 128, Vineburg, CA 95487 (800) 221-0229 in California; (707) 996-2113 for other areas. W1

International Closures & Supplies, San Leandro, CA (415) 483-3750. C8, S2

IRAPP, 195 Dry Creek Rd., Healdsburg, CA 95448 (707) 433-9471. R1, T3

JV Northwest Engineering, 18088 SW Lower Boones Ferry Rd., Portland, OR 97223 (503) 684-1490. T1

Kernco Instruments Co., Inc., 420 Kenazo Ave., El Paso, TX 79927 (915) 852-3375. W2

Bruce King & Co., 1055 Bertelsen, Eugene, OR 97402 (503) 485-0050. V2

KLR Machines, Inc., 1925-B Francisco Blvd. East, San Rafael, CA 94901 (415) 456-4774; 47 West Steuben St., Bath, NY 14810 (607) 776-4193. H1, P1, S2

Mel Knox/Stone, 1229 Third Ave., San Francisco, CA 94122 (415) 661-3413 (415) 661-1616. B2, B8, B9, B10, L4

LaFitte Cork & Capsule, Inc., 1180 Hamilton Ct., Menlo Park, CA 94025 (415) 322-1838. C8, S2

Latchford Package Co., 1823 Egbert Ave., San Francisco, CA 94124 (415) 467-1440; PO Box 01707, Los Angeles, CA 90001 (213) 587-7221. C8, S2

Mack-Wayne Closures, PO Box 405, Wayne, NJ 07470 (201) 696-1212; 285 Sutton Pl., Santa Rosa, CA 95401 (707) 584-9711. C9, S2

McBrady Engineering Inc., PO Box 204, East Hazel Crest, IL 60429 (312) 798-6565. B10

Meyerworld Packaging Machinery, 60 Prescott St., Worcester, MA 01605 (800) 343-6098, (617) 755-3110. L4

Microlife Technics, PO Box 3917, Sarasota, FL 33578 (800) 237-6831. M1

Miles Laboratories, Inc., Biotech Products Div., PO Box 932, Elkhart, IN 46515 (800) 348-7414. E2

Millipore Corp., Bedford, MA 01730 (800) 225-1380. F2

Milltronics, Inc., 709 Stadium Dr. East, Arlington, TX 76011 (817) 277-3543. T3

Moffett Co. Inc., 6985 Via Del Oro A-5, San Jose, CA 95119 (408) 578-4910. B2, B9, C8, B10, F2, F3, H1, L6, P1, S2, S4, Y1

Monitor Manufacturing, PO Drawer AL, Elburn, IL 60119 (312) 365-9403. T3

VILTER OWNERS

Order your compressor parts from PRP and you'll save. Plus you'll receive 12/18 month guaranteed top quality PRP manufactured parts.

Call 415-887-4105
Overnight delivery available

POWER REFRIGERATION PARTS CO.

3466 Arden Road, Hayward, CA 94545

?

Questions and opinions wanted. Write to Practical Winery.

Nalco Chemical Company, 2901 Butterfield Rd., Oak Brook, IL 60521 (312) 887-7500. F5

Gene K. Nelson, 12786 Old Redwood Hwy., Healdsburg, CA 95448 (707) 433-5138. B2, B3, F6

Netafim Irrigation Inc., 104 S.Central Ave., Valley Stream, NY 11580 (516) 561-6650; 2577 S.Sarah Ave., Fresno, CA 93706 (209) 485-9600, Northern California: (707) 763-1117. I3

Novo Laboratories, Inc., 59 Danbury Rd., Wilton, CT 06897 (203) 762-2401. E2

Pall Ultrafine Filtration Corp., Cortland, NY 13045 (607) 756-7535. F2

John Picchi, A.I.A., 340 Tesconi Circle, Ste. C, Santa Rosa, CA 95401 (707) 544-2060. A2

Pickering Winery Supply, 1300-22nd St., San Francisco, CA 94107 (415) 821-2400. C2, C3, C4, C5, F2, T2

Pneumatic Scale Corp., 65 Newport Ave., Quincy, MA 02171 (617) 328-6100. B10

Power Refrigeration Co., 3466 Arden Rd., Hayward, CA 94545 (415) 887-4105. R1

Process Engineers, Inc., 3329 Baumberg Ave., Hayward, CA 94545 (415) 782-5122, (800) 972-0904. A2, B9, B11, B10, C1, C10, D1, F2, F3, F6, H1, H2, L4, L6, P1, P2, P3, S1, S3, S4, T2, T4, U1, V1, W3

Prospero's Equipment Corp., 134 Marble Ave., Pleasantville,NY 10570 (914) 769-6252; 840 Piner Rd.#14, Santa Rosa, CA 95401 (707) 523-2900. B10, F2, L4, L6, P1, S4

Rainbird Sales,Inc., 145 N. Grand Ave., Glendora, CA 91740 (818) 963-9311; 1883 Massaro Blvd., Tampa, FL 33519 (813) 621-0624. I3

Ramondin USA, 1041 Edwards Rd., Burlingame, CA 94010 (415) 340-7225. S2

Refrigeration Technology,Inc., 5130 Blank Rd., Sebastopol, CA 95472 (707) 823-3222. R1

Rohm Tech Inc., 10 E.40th St., New York,NY 10016 (212)686-6166. E2

Seitz Enzinger Noll Machines,Inc. 3095 Kerner Blvd. Suite G, San Rafael, CA 94901 (415) 457-5155. B10, B9, F2, L4, L6, P1, P3

George M. Schofield Co., PO Box 170, St. Helena, CA 94574 (707) 963-3333. F4, V3

Scholle Corp., 19500 Jamboree Blvd., Irvine, CA 92715 (714) 955-1750. B1

Scott Laboratories, Inc., PO Box 9167, San Rafael, CA 94912 (415) 457-8460; Elmira, NY (607) 739-8818; Pickering, Ontario, Canada (416) 839-9463; Kelwona, British Columbia (604) 769-5393. B9, B10, B11, C8, D2, E2, F2, F3, F5, H1, L5, L6, M1, P3, S2, S4, T2, W2, Y1

Spokane Metal Products, PO Box 3621, Spokane, WA 99220 (1-800) 572-3709 WA, (1-800) 541-3601 outside WA. T1

Stefanich, PO Box 77021, San Francisco, CA 94107 (415) 974-5526. B2

Storm Engineering, 15 Main St., Winters, CA 95694 (916) 795-3201 W4

TEMCO, Inc., PO Box 6039, Bellevue, WA 98007 (206) 747-1550. C7

Temblock Corp., PO Box 40230, Santa Barbara, CA 93103 (805) 684-7676. B10

Tonnellerie Francaise, 1401 Tubbs Lane, Calistoga, CA 94515 (707) 942-9301. B2

Turrentine Wine Brokerage, 125 Fairhills Dr., San Rafael, CA 94901. B12

2K Packaging Enterprises, Inc., 7914 SW Nimbus Ave., Beaverton, OR 97005 (503) 641-8990; 428 N. Buchanan Circle #2, Pacheco, CA 94553 (415) 676-8990. B10, B11, C8, C9, C10, D2, E2, F2, F3, F5, H1, L1, L2, L4, L6, S2, S4, Y1

Valley Foundry & Machine Works, 2510 S. East Ave., Fresno, CA 93717 (209) 233-6135. C7, C10, D1, F2, F6, H1, H2, I4, L6, P1, P3, S1, S3, T1, T2, T3, T4, V1, W3

VINQUIRY, 301-D East Street, Healdsburg, CA 95448 (707) 433-8869. L5, M1, W2, Y1

Water Dynamics, 659 Main St., St. Helena, CA 94574 (707) 963-5822. I3

WESTEC, 195 Dry Creek Rd., Healdsburg, CA 95448 (707) 433-8829. F6, P3, W3

Brian R. White Co., Inc., 313 Henry Station Rd., Ukiah, CA 95482 (707) 462-9795. I3, S1, V2

Wilden Pump & Engineering Co., 22069 Van Buren St., Colton, CA 92324 (714) 783-0621. P3

Wine And The People, 907 University Ave, Berkeley, CA 94710 (415) 549-1266. B10, C9, D1, F2, F3, H2, L2, P1, P3, S4, W2

Winery Equipment Systems, PO Box 3361, Napa, CA 94558 (707) 257-1103. P3, W3

The Wine Lab, 1200 Oak Ave., St. Helena, CA 94574 (707) 963-7903. L5, M1, W2, Y1

INDEX OF VENDOR SERVICES AND SUPPLIES

A1	Adhesives
A2	Architect/Engineer
B1	Bag-in-Box Packaging
B2	Barrel Broker/Cooper
B3	Barrel Bungs
B4	Barrel Pallets (portable)
B5	Barrel Storage Racks (stationary)
B6	Barrel Shaving
B7	Bird Control
B8	Bottles
B9	Bottle Cleaners/Washers
B10	Bottling Equipment
B11	Bottle Washing & Sterilization
B12	Brokers (Wine, Brandy, Alcohol)
C1	Centrifuges
C2	Chemicals
C3	Cleaning Agents
C4	Coatings/Protective Mildewcides/Epoxies
C5	Computer Services
C6	Consultant, Winemaking
C7	Conveying Equipment
C8	Corks (natural)
C9	Corks (plastic)
C10	Crushers-Stemmers
D1	Dejuicers
D2	Diatomaceous Earth
E1	Electrical Installation
E2	Enzymes
F1	Fertilizer
F2	Filter Equipment
F3	Filter Media
F4	Financing/Financial Services
F5	Fining Agents
F6	Fittings, Stainless Steel
G1	Gases (CO_2, Nitrogen, SO_2)
G2	Grape Harvesters (mechanical)
H1	Heat Exchngrs/Cold Stabilization Eqpmt
H2	Hose
I1	Insect Control
I2	Insulation (foam)
I3	Irrigation Equipment
I4	Ion Exchange Equipment
L1	Label Coding Equipment
L2	Label Gluing Equipment
L3	Labels
L4	Labeling Machinery
L5	Laboratories (analysis)
L6	Lees Filter-Press
M1	Malolactic Bacteria
M2	Mobile Bottling Line
N1	Nurseries
P1	Presses
P2	Process Control Systems
P3	Pumps
R1	Refrigeration/Cooling
S1	Sanitation Equipment
S2	Secondary Closures
S3	Sparging Equipment
S4	Sparkling Wine Eqpmt
T1	Tanks (metal)
T2	Tank Cleaning Eqpmt
T3	Tank Monitoring Eqpmt
T4	Tank Venting Eqpmt
T5	Transportation, Bulk
T6	Trellising Supplies
T7	Turbidity Meters
U1	Used Equipment
V1	Valves
V2	Vineyard Equipment
V3	Vnyd Planning & Mgmt
W1	Warehousing
W2	Wine Analysis Eqpmt/Supplies
W3	Winery Eqpmt Dsgn/Mfr
W4	Winery Water Engineering
Y1	Yeast

INDEX OF ADVERTISERS

American Society for Enology & Viticulture	14
American Wine Society	43
Anthony Smith & Associates	62
Ashbrook-Simon-Hartley	39
Australian Society of Viticulture & Oenology	60
Barrel Builders	16
Bellagio Tank Co.	32
Blake Printery	26
Boswell Company	27
Calpac Container Co.	11
Cellulo Company, Finer Filter Div.	70
Chateau Bottlers	13
Cherokee Tank Lines	29
Cherry-Burrell	61
The Compleat Winemaker	18
Cork & Seal of California, Inc.	54
CPN Corp.	69
Criveller Co.	57
Custom Cooperage	74
Data Consulting Associates, Inc.	67
Demptos Cooperage	80
Eagle-Picher Industries, Inc.	33
ENCORE!	14
Expo Instruments, Inc.	72
Fischer & Schug Winery Equipment	37 + 65
Genencor, Inc.	44
Grefco, Inc.	28
Groskopf Warehouse	85
Industrial Chemical Co., Inc.	32
International Closures & Supplies	34
IRAPP, Inc.	96
ITT Jabsco	82
JV Northwest Engineering	15 + 83
Lafitte Cork & Capsule	7
Bruce R. King	8
KLR Machines, Inc.	30
Mel Knox	38
Mack-Wayne Closures	56
Merry Vintners	27
Meyerworld Packaging Machinery	81
Miles Laboratories, Inc.	41
Millipore Corporation	36
Monitor Manufacturing	78
Otto Sick Corporation	9
Pickering Winery Supply	76
Power Refrigeration Co.	92
Process Engineers, Inc.	21
Pneumatic Scale Corp.	53
Rector & Blackburn	45
Rohm Tech, Inc.	25
George M. Schofield Co.	50
Scholle Corp.	68
Scott Laboratories, Inc.	3
Seitz Enzinger Noll Machines Inc.	58
Spokane Metal Products	20
Stefanich	35 + 76
Storm Engineering	17
Sybron Gamlen	69
Templock Corp.	55
Tonnellerie Francaise	67
Tonnellerie Mercier	58
2K Packaging Enterprises, Inc.	22
Upright Harvester	73
James Vahl	24
Valley Foundry & Machine Works	2
V & E Consulting and Management	75
VINQUIRY	40
Water Dynamics, Inc.	79
WESTEC	23
Brian R. White Co.	54
Wilden Pump & Engineering Co.	19
Wine and the People	71
Wine Appreciation Guild	57
Wine East	68
The Wine Investor	87
Workman Enterprises	73

SUBSCRIPTION CARD

Annual subscription: $24.00/ year

Outside the United States, add $8.00/year postage, or $20.00/year air mail.

Mail to:
PRACTICAL WINERY
15 Grande Paseo
San Rafael, CA 94903
(415) 479-5819

556

NAME

ORGANIZATION

ADDRESS

CITY STATE ZIP

SIGNATURE

Check enclosed for $ _____ for _____ subscriptions.

Bill me for _____ subscriptions, for _____ years.

PRACTICAL WINERY BINDER

$5.00 ea. + $2.00 postage and handling.
Check enclosed for $_____ for _____ binders.
Please ship to:
Name_____
Address_____
City_____ State_____ Zip_____

PRACTICAL WINERY WORD-FIND PUZZLE

N O I T A G I R R I O X B E
O N O D R O C T E S D U P K
I B I E K A O S C I O A O A
T C T N N R I I T N R E T T
C S E E N L H T O G E D A P
E A T L L A O I R L T R S U
F P U E L E T V S A T O S X
N Y R O T A E P N S I B I S
I T B S R J R S I S M G U E
E U A T E U Q A K U E L M R
R E L K N I R P S G O Y U D
Y I E I J U I C E R Z C S N
F L N E R C A P A N N O T A
E G A R I T R I E C I L A M

~~ACRE~~
ANDRES
BORDEAUX
BRUT
CANE
CELLAR
CORDON
EMITTER
ENZYME
ESTER
EUTYPA
FILTRATION
GLYCOL
GRAPE
IRRIGATION
ISINGLASS
JEKEL
JUICE
LEES
MALIC
MUSCAT
MUST
NAPA
OAK
ODOR
OHIO
POTASSIUM
PRUNING
RECTOR
REINFECTION
SKINS
SPRINKLER
TANNIN
TIRAGE
TON
TRELLIS
UPTAKE
VITIS
YEAST

WINERY SPECIALISTS, IN THE HEART OF THE WINE COUNTRY.

Process Refrigeration and Air Conditioning Package with Heat Reclaim

- Water Pre-Heat Systems
- Air Conditioning
- Glycol Piping
- Juice Warming Systems
- Must Transfer Systems
- Must Chillers
- Wine Chiller Packages
- Custom Plate Coils
- Glycol Chiller Packages
- Wine Process Lines

Industrial Refrigeration and Process Piping, Inc. (IRAPP), located in the heart of California's North Coast wine region, offers over a decade of experience in custom engineering, installation/start-up and service, in wine processing systems.

Our state-of-the-art, automatic chilling units, process piping, aluminum, stainless and carbon steel fabrication are proven reliable in wineries throughout California.

All of our work is engineered for efficiency to your specific needs and fabricated from the highest quality industrial components available.

Our service is, of course, immediate and backed up by a complete stock of replacement components, assuring minimal downtime. As well, all systems are completely warranteed for one year.

We are also proud to offer you a complete line of winery equipment, from our subsidiary WESTEC. The ultimate in quality, simplicity and reliability.

Please come by or call us for a free consultation and estimate. IRAPP and WESTEC your convenient, complete North Coast winery equipment, systems and service center.

IRAPP INDUSTRIAL REFRIGERATION & PROCESS PIPING, INC

P.O. BOX 129 · 195 DRY CREEK RD., HEALDSBURG, CA 95448 · 707 433-9471